COMPUTERWORLD

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IPS Cobol May Help DOS Users

By Don Leavitt
CW Staff Writer

TORONTO–A new Cobol compiler that runs under 360/DOS promises users dramatic improvement in compile time and modest improvement in the run time and core utilization of the object programs.

Developed by I.P. Sharp Associates, a software house here, IPS Cobol will rent for $950/mo or $10,000/yr. IBM's Cobol D compiler is free and its Version 3 of ANS Cobol for DOS will rent for $75/mo.

But in tests against the Cobol D compiler, IPS Cobol has compiled a program up to four times as quickly and has improved the run time and core utilization of the object programs by about 10%, according to Roger Moore, who is in charge of the IPS project.

Sharp believes the improved efficiency will counterbalance the price. In addition to cutting machine time, the improvements might allow a user to avoid an otherwise inevitable upgrade of hardware. Another saving could be in reducing billable machine time for work done outside a user's installation.

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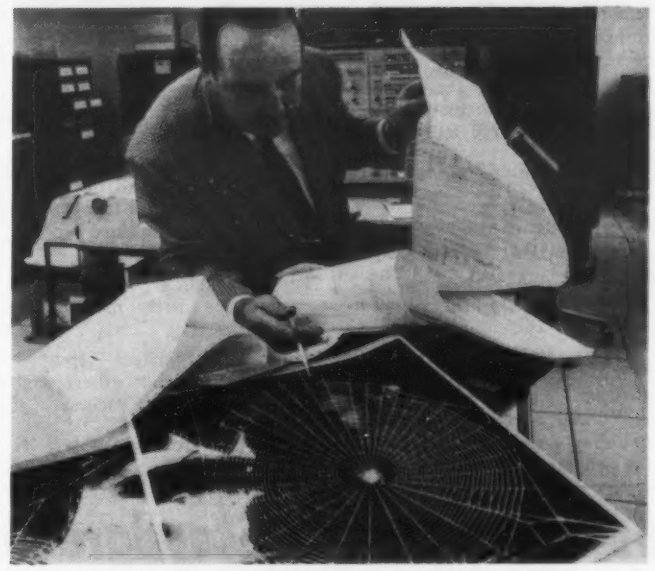

Spider Takes 'Trips'

Dr. Peter N. Witt, director of the North Carolina Mental Health Department, is feeding drugs to a spider and then using a computer to determine the effect on the spider's web spinning. **(Story on Page 7)**

DP Centers Dig Out In Hurricane's Wake

By Thomas J. Morton
CW Midwest Bureau

CORPUS CHRISTI, Texas – What does the manager of a data processing center do when his operation is in a 162 mph hurricane? "He prays a lot, mister," one DP manager told *Computerworld*, "he prays one helluva lot."

It would appear that the prayers helped. "The data processing community," said George W. Jordon, president of Jordan Assoc. Inc., a time-sharing firm, "fared a lot better than the rest of the town, and the reason is obvious: most of the people in data processing dug and dug in heavily."

The DP community in this wind-ravaged Texas city is hurt and limping a little and still somewhat dazed. But now, two weeks after Celia, most of the centers are back on the air.

Other operations managers, like Jordan, attribute this to "digging in." That saved their centers from the ruin that spread through the city, but digging in couldn't and didn't save them from the problems they faced after the hurricane blew itself away.

Power

Power was the first problem. There was none. Equipment that survived the havoc couldn't be tested or run. Air-conditioning was a thing of the fondly remembered past. The humidity, increased by water-soaked floors and walls, rose and the concern for the lack of power grew.

"Power," Jordan said, "was off for approximately one week for every center in town."

There were some exceptions. Centers in those areas high on the power company's priority lists got their power back sooner, but those were rare.

At a grocery chain headquarters on the outskirts of town, the operations people of HEB Foods, Inc. tried to outwit the power loss by chartering a plane and flying their programs to a computer center in untouched San Antonio 150 miles away. The idea was good, but it proved fruitless.

HEB Foods found a new problem in trying to solve their old one: incompatibility. They flew back to Corpus Christi and set up an auxiliary power source to get their dehumidifiers and air-conditoners going, dried out their equipment, stamped out the water bugs, and ran their programs on their own equipment.

Air-Conditioning

Air-conditioning was another problem. The DP center at Coastal States Gas was in the basement of the building. The storm flooded the center and ruined the building's air system. Coastal dried out the center and brought in two trucks for piped in air-conditioning.

Kenneth DuBose of Data Sciences Inc. told CW that even with the two trucks Coastal can't get the temperature down below 83 degrees with the equipment running.

Now, according to DuBose, Coastal is taking those programs that escaped the deluge of water to Dallas to be run on an IBM

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'Old' Computers Keep Working, Cost-Cutting May Extend Life

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – About 70% of the computers installed in federal agencies bearing the label of nine major mainframe manufacturers are second generation systems, and cost-cutting within the federal establishment is expected to play an important role in extending the life cycle of these systems.

The nine manufacturers are IBM, Univac, Honeywell, GE, Burroughs, Control Data, NCR, RCA, and Xerox Data Systems.

IBM's 1401 is still the workhorse of the second generation computers with some 350 in use as of last Jan. 1. Univac's 1004, 1005 and 1050 also proliferate, with some 690 of them still chugging away.

Budget cutting, predict many government officials, will force some federal users to think twice about getting rid of second generation machines. Said one source: "EDP is a vulnerable spot for cost reduction. Agencies will have to make do with what they have, and they are going to find out that these second generation machines have a 10 year life cycle, not a five."

James P. Nigro, director of the Computer Sciences and Technology Center at the National Bureau of Standards explained: "With the present leveling off on budgets, I think we're going to see a definite slowdown on installation of third generation computers. People will retain their present inventory, including second generation machines.

"It costs money to reprogram and the day isn't here yet when completely compatible software is available. Also, second generation mainframes are usually still in good shape. The components are reliable.

"The only thing you might have to replace is peripheral – anything that's mechanical in nature doesn't have the life span of solid state," Nigro said.

"More and more organizations are acquiring new peripherals

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Proponents 'Not Surprised'

No DPMA Action on Standards Review

By Thomas J. Morton
CW Midwest Bureau

CINCINNATI, Ohio – A challenge was thrown at the feet of the Data Processing Management Association (DPMA) at its convention last June in Seattle, and, according to the challengers, no one at DPMA has dared to pick it up.

"I knew they [DPMA executives] wouldn't when I threw it," said Milton Bryce, president of Tekfax, Inc. of this city, "and I told them so, right then and there."

Bryce hurled his challenge during the seminar he and Robert W. Bemer of General Electric gave on standards during the open selection seminars conducted on the last day of the DPMA International Convention.

His challenge was: "I would like to make the following specific proposal: [that] a data processing review board be established within DPMA.

"Initially this board would establish the framework for issuance of all standards and all of the administrative details associated with them.

"Associated with the [review] board would be working committees that would review and formulate the details of the standards for specific areas."

Bryce recently told CW: "In my presentation we [he and Bemer] specifically recommended that a standard review board be established within DPMA. This was well received by those attending the seminar.

"We had also suggested, during the session, that the board would not be formulated by DPMA. Several DPMA members were quick to state that it would be formed, that they would follow through personally."

When queried by *Computerworld*, a spokesman for DPMA in its headquarters in Park Ridge, Ill., said that DPMA was working on standards as they had been, but that a review board for standards had not been formed.

Unaware of Challenge

The spokesman said that he was "unaware" of Bryce's suggestions and challenge. "One of our people had been attending the American National Standards Institute committee meetings four times a year, and that's about the extent of it."

He added, "When I say that there is nothing specific, I don't want to give the impression that we are fluffing it off. There has been nothing definite proposed and we do not have a specific project to set up such a committee right now."

Bryce, aware of the DPMA

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Emulation Still Common in Large Centers

By Michael Merritt
CW Staff Writer

NEWTONVILLE, Mass. – "I don't think we've ever achieved the second generation software efficiency on our third generation equipment, cost-effectively speaking. Probably we'll hit good third generation software efficiency just about the time we convert to fourth generation equipment."

So said the DP manager of a West Coast aerospace firm, one of many of the hundred largest industrial users surveyed by CW.

CW's straw poll showed that on the eve of the fourth generation, second generation software is still very much with us.

Every Fifth Program

For example, an average of 21% of the jobs done at the big industrial centers are second generation emulation.

The median figure was 10%, showing that while a sizable number have converted completely to third generation programs there are many centers that have barely begun the conversion process.

Among those users who reported less than 25% emulation the second generaton programs were almost invariably accounting packages – payroll, receivables, and so on.

Except for the centers most heavily committed to emulation, most of the managers described plans to substantially convert to third generation programs within the next 12 months.

The major mode for conversion seemed to be resystemization rather than translation.

Programmer Problem

Several managers said that it was difficult to find programmers familiar with second generation languages.

The head of data processing for an Akron tire company said, "Second generation programmers can't be found on the open market – it's a disappearing art." Other managers mentioned that they – luckily – still had a few programmers on their staffs who were familiar with the old programs.

"There's no fun for programmers in translating second generation programs. It's a very low morale job," one manager noted. "It worked all right in experiments, but on a day-to-day basis it didn't pan out."

One installation even had a 7094 school to teach third generation programmers how to write for the emulation box on the 360.

Most of the managers seemed to feel that writing second generation programs was a lost cause, however, and are just waiting to rewrite all the small accounting programs into a new system that will use third generation equipment efficiently.

The managers reported mixed experiences with mechanical translation.

Only one manager reported real disasters, and others said they had a degree of success.

While the trend definitely is toward complete conversion to third generation software and equipment, there were a few managers who wished it had been possible to avoid the change.

Some second generation machines are still paying their way, for example. "We've got cheap 1401 Gs and Hs and we can't see going to 360/20s or 30s. It would be a tremendous job to convert and management is tremendously happy with the cost of the 14012," a manager noted.

However, programming is again the bugaboo.

The manager for a large chemical and photographic company said that he would have kept his second generation equipment had he not found that running a mixed shop – second and third generation machines together – was confusing and costly.

"We would have been well off if we could have kept the 7080s" he remarked, "since the uptime was running the same as the 65s, but the mix of work, the scheduling and programming problems proved prohibitive.

DPMA Standards Stand Leaves Standardization Standing

(Continued from Page 1)

statement, said: "This is exactly the reaction I anticipated. This is why we are where we are today, because they will not act. I told DPMA that at the meeting, during the seminar. That is when DPMA members said they would see to it that DPMA did act in this case.

"DPMA is like any governing body, especially a large governing body, it just will not act. That would take too much work."

Bemer, in his presentation preceding Bryce's proposal, asked if DPMA members thought the definition of a standard was: "A dull document produced by a committee of dull people who argue interminably and consume reams of paper in letter ballots before they produce a consensus on a position that is already obsolete when it is adopted."

Bemer went on to say that he preferred the definition of Dr. A.V. Astin, former director of the National Bureau of Standards, who said: "A standard is an arbitrary solution to a recurring problem."

Standardization Vital

Bemer listed the reasons why standardization was vital, in his opinion, to the DP industry. He stressed data interchange and movement, multiple use of data (data banks), transfer of data to: additional equipment, multiple equipment, new equipment, linked equipment, and back-up.

He cited economies of competitive acquisiton, avoidance of reinvention, personnel turnover and training. "We can give many more," he said, "but they all come down to one thing .... money!

"We all like it because Westinghouse, GE, and Sylvania light bulbs fit the same sockets and give us a cheaper price via competition, but we are playing in a bigger game than light bulbs. Perhaps, some may not realize how big.

"Accompanying over $5 billion in hardware in 1969," he told his audience, "was about $7 billion in software and mechanically recorded data. Our business [the data processing industry as a whole] is extrapolated to be the largest in the country some time around the end of this new decade. A major redundancy factor exists, however.

"The U.S. government gets from 30% to 50% utilization from their equipment ... other users not much more ... and they worry about it. But how about that $7 billion in software? No more than $1 billion worth is reusable on other equipment and other people's problems due to transferability problems. This is an even lower utilization rate."

Bryce, in his presentation following Bemer's at the convention, suggested to his audience that he might know the reasons why the industry had not in its 19 year history developed a formalized body on standards.

He suggested that the industry didn't want standards because "standard operating procedures don't fit the image we like to project for ourselves." Bryce said that standards, by definition, are measuring devices. He then asked the audience if they thought that perhaps there are "those of us who do not care to have our performance measurable?

"The point I am making," he said, "is that we, as managers and professionals, had better come off our high horses and start acting like managers and professionals.

"Our managements expect results, more so today than at any time. They are no longer impressed with the 'gee whiz' aspects of computers and our promises.

"Standards are a good start. With them we can start to control our environments, which includes the suppliers, instead of the other way around."

Bryce asked, "What can we standardize?" He offered instances where, in his opinion, standardization of programming would have proved beneficial, then summarized: "What should be standardized is the methodology or 'how' aspects of data processing from systems analysis to day-to-day operations."

Bryce stated his reasons for the importance of standardization, specifically referring to economy, lack of intra-industry communication, and implementation of training within the industry.

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Fragrant Application

NEW YORK – International Flavors and Fragrances Inc., a New York manufacturer of perfumes, colognes, and flavoring agents, is using a computer program to help set prices on products. About 4,000 ingredients and basic ingredient combinations are involved.

The program, developed by Univac Data Processing Services, allows the firm to analyze current costs on any of 8,000 proprietary formulas.

DOS Users Get Choice

(Continued from Page 1)

The major improvement in compile speed comes in the third pass of the four-pass IPS compiler. This pass generates the code for the Cobol verbs. In the Cobol D compiler, separate subpasses are made for as many as 10 different groupings of verbs because a smaller partition is used. IPS Cobol uses a larger partition, about 46K, and handles all the work in a single pass.

The compiler was started a year ago by a team including Bill Kindree, who previously worked on the development of the University of Waterloo's Watfor compiler. Roger Moore, now in charge of the project, joined the team in November.

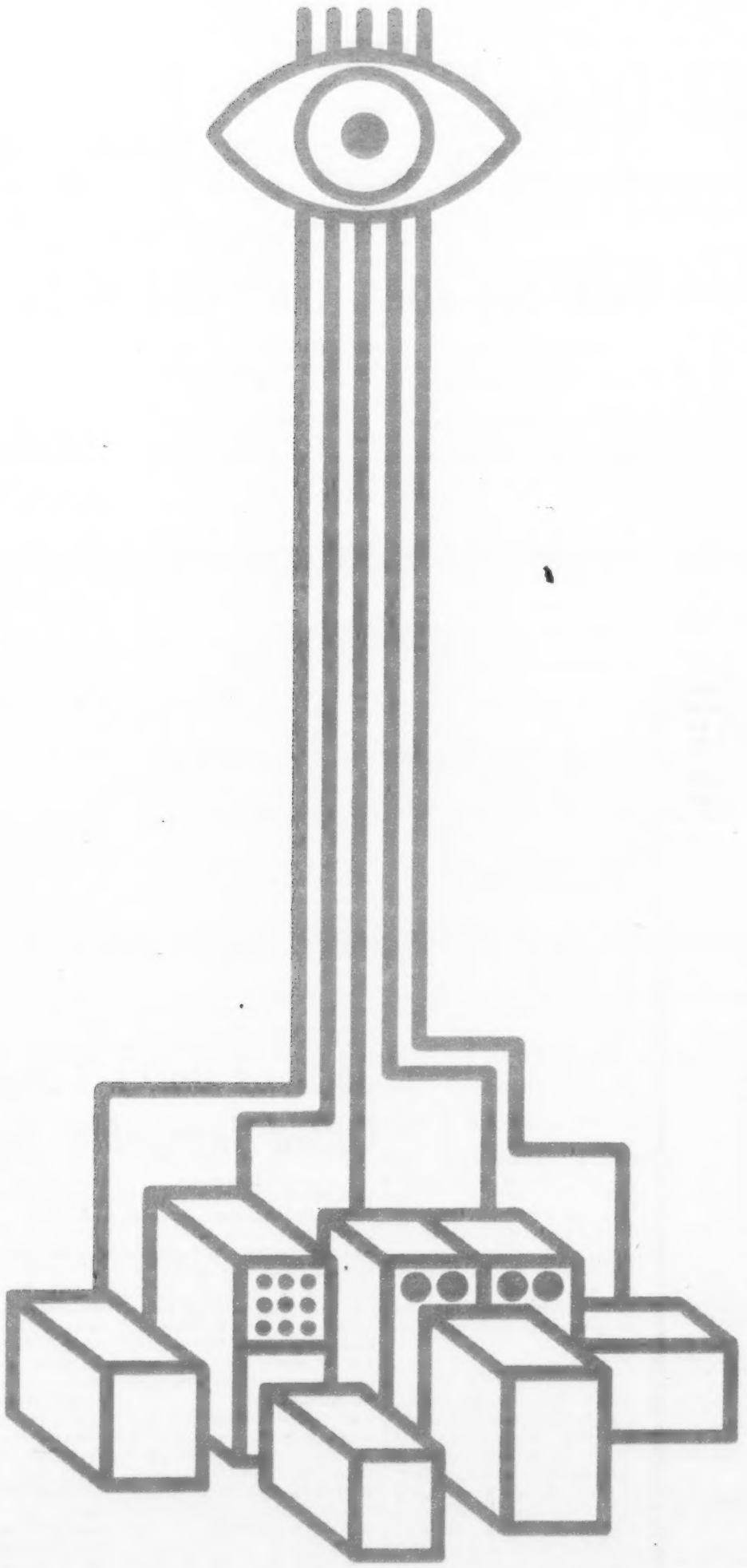
IPS Cobol is source-language compatible with IBM's Cobol D. Currently it is in use only in the developer's installation, and debugging of the more esoteric items, like check-point restart, is continuing.

Sharp told CW that a copy of the compiler is going out to a test installation shortly.

The compiler is to be offered first in Canada and will be available in the United States later.

I.P. Sharp Associates is in the Dominion Center Tower, here.

A tape-oriented Cobol compiler for the 360/20 was released last autumn by Decision Systems, Inc., Paramus, N.J. (CW, Nov. 19). This was followed by a disk version this spring (CW, May 27), but both were written in the Model 20 Basic Assembler Language, and cannot be used on other models of the 360 series without at least some recoding.



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Power Main Problem as Corpus Christi DP Community Dries Out

(Continued from Page 1)

data center there.

DuBose, manager of Data Sciences, Inc. (DSI), a T/S firm offering consulting, facilities management, and programming services, solved his own air-conditioning problems by installing window units in the boarded up windows of his center in the Guaranty Plaza building downtown.

DSI was one of the lucky ones. They were in a section where power was restored very quickly, and they were located "just right" in the building where a social club was, according to DuBose, "obliterated." DSI is back on the air next door to a shambles, and DuBose admitted he was not one of those who dug in. "We believed the forecast that predicted a 90 mph wind," he said. "Our precautions were just superficial. We weren't safe, we were lucky."

People Problem

People were a problem. "You don't live through a hurricane," said a bank DP manager, "and then come back to work as if you'd just had a few extra days off." People had just seen their homes ruined, their neighborhoods leveled. Power was a source of worry there, too. No food in the stores, no refrigeration in their homes. The families of the DP people were uppermost in their minds. When those problems were solved, they came back to work only to have to solve them all over again.

"I sure learned one thing this time," said Jordan, a veteran of hurricanes Carla, Beulah, and Celia, "people are a whole lot more important than things."

When the "things" started to run again, people turned to people. The DP community turned within itself with offers of help to their kind. "The funny thing was," said DuBose, "that those who had the most damage were the ones where the power came on the soonest. Those with the least damage had no power."

Offers were made, but incompatibility was the bug. DuBose offered assistance to Shenk Service Bureau, or tried to. "Carter Shenk is one man who's wiped out," he said. "There are cards and records all over the floor, and a wall has fallen on his equipment damaging it badly. I've been trying to reach him, but I can't even find him."

Interdependency

Power, environmental controls, people, computing equipment, and long lines were all functional before Celia came to Corpus Christi. The DP community here learned that they all combine to make a system work when, one by one, the components were absent.

The power is coming back, but not fast enough for Citizens State Bank which has taken its work to Austin, but fast enough to let Coastal States Gas know that it was air-conditioning that would force them to take work to Dallas.

The people are back at DSI, but, according to their manager, they aren't down to work yet. And he doesn't blame them. He admits he isn't down to work either, even though he is very aware that he has a week of income-producing work to make up.

New equipment couldn't help Shenk Service; their records are destroyed. When the long lines get back, customers of Jordan and DuBose can get through to Los Angeles and South Carolina again and the manufacturers' service departments can order parts and components "rush."

But they're learning. Jordan learned a long time ago about data centers with a lot of plate glass. His building, he said, is built like Fort Knox. But it didn't help him when the power went.

"I guess," he said, "I'm going to have to have a power unit. It's going to be another $10,000 to $20,000, but I guess I'm going to have to have it."

"I was very lucky this time," said DuBose. "Next time we get one of those things, I'm going to put all my disks and data files in a bank vault."

"It would probably cost a billion dollars," someone else said, "but we should have power and phone lines underground, at least on these coast states."

"We've got 130 stores," said the people at HEB Foods, "and data centers spread all through them. We're going to make our centers compatible . . . . fast."

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Feds Say EDP's the Place to Cut Costs

(Continued from Page 1)

and attaching them to current second and third generation machines."

Nigro said that some special activities, such as the scientifically oriented computer operation in Livermore, Calif., will continue to bring in new equipment, but at a reduced level. "They need the latest state-of-the-art machines," he explained.

Some Conversions

A spot check of federal agencies disclosed that in some areas where they need warrants, second generation systems are on the way out.

Thomas Chorpenning, chief of the systems support branch, Agency for International Development, said that the IBM 1401 used by the agency since 1963 is now converting personnel, payroll and other comptroller activity programs to a 360/50 installed earlier this month.

"We are going into teleprocessing type applications," said Chorpenning, "and the Model 50 gives us the capacity and capability we need." Core is 256K, and the system has six tape units, one 2314 with nine disk drives and one 2314 with five disk drives. The six-tape 1401 has a 16K core.

Chorpenning said the conversion should be finished by year-end and he will not be sorry to see the 1401 go. "It did a pretty good job for us," he added. "But as you learn with the advancements in technology, you want to work with the latest equipment."

The agency's unit, he said, may be used within an AID mission once its job in Washington is completed. If not, the machine will be declared surplus and another agency within the federal government might pick it up for use.

'Black Box'

At the Bureau of the Census, there has been talk of dumping the 1401 in operation, but Joseph Pewterbaugh, chief of the computer operations branch, said: "We haven't done it since our system has a black box converter that IBM specifically built for us. It converts IBM language into Remington Rand language for use on our Univac 1107 and 1108 computers. We do our card-to-taping on the 1401."

Use of the 1401, however, according to Pewterbaugh, has gone down considerably. "But the machine, which is seven or eight years old, is still efficient."

The Army's Finance and Comptroller Information Systems Command meanwhile is discarding three Honeywell 200s in favor of two Control Data 3300s as part of an economy move.

According to Col. Harold D. Wolaver, director of automation for the command, two computer facilities were merged. One had the Honeywell units, the other the CDC. "The 200s were at capacity," he said, "and the larger capacity of the 3300s makes it more efficient to convert the programs on the Honeywell machines to them." It will take about 15 months to complete the job.

'Don't Need 3rd Generation'

The General Services Administration in Washington, however, has a Honeywell 200 and 2200 and a GE 400, and declared George Dodson, assistant commissioner of automated data management services: "We've had no need to go to third generation equipment. We can use these machines another two or three years."

The systems handle applications on inventory, logistics, procurement and "a complete range of business programs."

At the U.S. Information Agency (USIA), a Burroughs B300 installed in 1967 is still handling housekeeping type routines – accounting and personnel applications. "We have no plans to replace the machine," said Walter Burroughs, who is chief of the data processing center.

Burroughs said: "If you get something that suits your purposes and it's economical then you should stick with it."

One of the questions that invariably arises concerns the willingness of computer people to continue working with second generation machines when newer ones are available.

"The guy trained on a third generation computer," Nigro of NBS said, "is not often willing to go to work on a second generation system. But the present money situation in the government will force some government people to revert to second generation machines.

"This won't be widespread, but it will occur whether they like it or not. This could be related to the individual used to driving a Cadillac who suddenly has to go back to a Volkswagen. He obviously wounldn't care for it," Nigro said.

36% of DoD's Computers Called 'Incapable' by Panel

Cw Washington Bureau

WASHINGTON, D.C. – Automatic data processing as utilized by the Department of Defense has come in for some criticism from a Nixon-appointed task force.

A blue ribbon defense panel, headed by Gilbert W. Fitzhugh, board chairman of Metropolitan Life Insurance Co., has made some suggestions to streamline the operation.

Although automatic data processing was only a small part of the report, the Fitzhugh panel stated that "36% of [the 2,800 computers used by DoD] are considered to be incapable of performing efficiently by current standards."

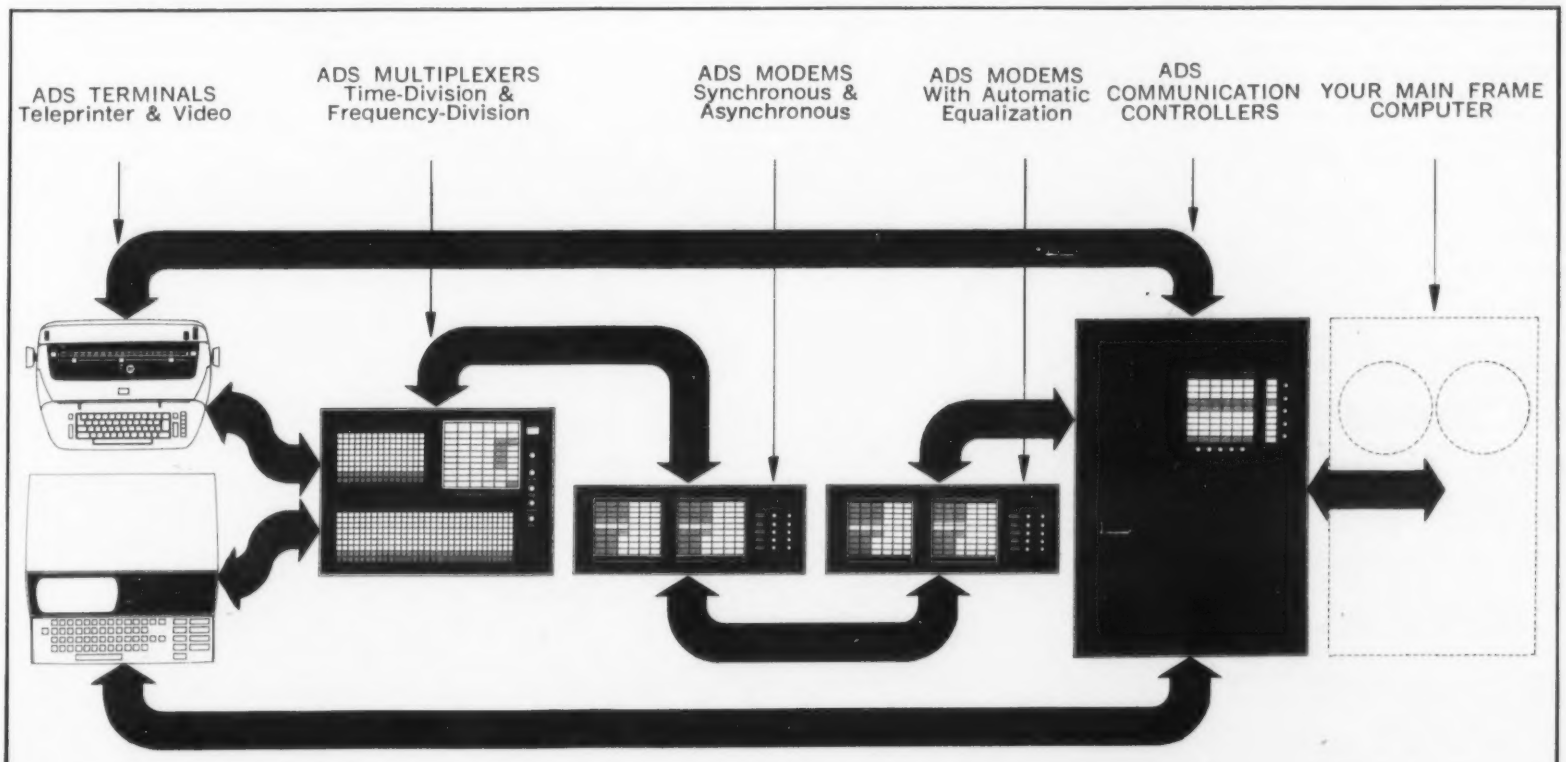
In many cases, the Fitzhugh group said, "The selection [of a system] is made by personnel who have no first-hand knowledge of the workload, but depend entirely on the description of the applications."

Other factors cited by the panel lending to wasteful management of computer resources within DoD: "Utilization rates (estimated 50-60%) of computers owned and leased by the DoD are low compared to those of industry." These are caused by constraints on overtime and paying shift differentials and inhibiting of effective sharing of equipment and resources between organizational elements of the department.

The panel also asserted that currently "no standards [exist] for determining total costs of ADP service" within DoD, and the department does not have enough skilled technical talent available. "There do not appear to be adequate plans for obtaining or training these professionals in substantial numbers."

The responsibility for DoD's ADP operation, the panel concluded, should be under the staff supervision of the assistant secretary of defense (telecommunications).

Ads = Total Data Communication Systems



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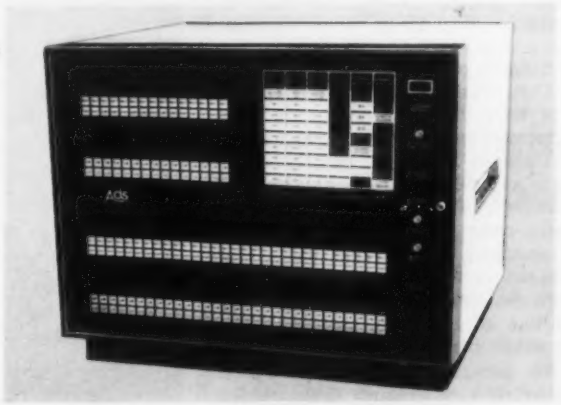

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NBS Researcher Developes System To Link Computer to Microscope

WASHINGTON, D.C. – The National Bureau of Standards, in collaboration with the National Institute of Health, has developed a microscope that reads and records features seen through it with the aid of a computer.

Designed by Philip Stein of the Bureau's Center for Computer Sciences, Dr. Lewis Lipkin of the National Institute of Neurological Diseases, and Dr. Howard Shapiro of the National Cancer Institute, the scanning system will be used in neuropathological studies, in autoradiograph counting, and as a tool in the design of systems for automating image processing.

The system consists of a microscope, an image plane scanner, a motor-driven stage, a computer, and the necessary interface hardware. The design of the instrument allows it to scan in three dimensions.

Computer control of the scan allows the operator to manually position the slide to locate features of interest and to note their positions in the computer memory.

When later instructed, the stage can return to within one step in each axis of every position previously noted, and the system automatically performs a scan at each position.

The scanner is connected to a closed-loop configuration with a Digital Equipment Corp. PDP-8 that controls the scan. This enables the system to evaluate each scan point on the basis of results of measurements at the preceding points.

The system computer controls the scan but processing the resulting data requires a larger computer. At present, a high-speed telephone line is the link with an image-processing computer.

The new microscope scanning system was required not just for medical applications, but especially as a design tool in creating new scanning systems. The manner in which a scanning operation is programmed or simulated on the system can guide the design of a specialized machine for scanning and image processing.

The new scanning system resulted from an NBS program sponsored in 1967 by the National Institute of Neurological Diseases and Stroke, and by the National Cancer Institute. Its goal was to develop an instrument that was capable of performing current tasks and also flexible enough for basic research into sensing and processing biological images.

Philip Stein views a slide through computer-controlled micrscope he developed in collaboration with NIH.

Cancer Treatments Planned for Patients In English 'First'

SUTTON, Surrey, England – The Royal Marsden Hospital, one of the world's leading radiotherapy centers for the treatment of cancer and allied diseases, is using a small computer to help plan treatments for individual patients in what is believed to be one of the first applications of its kind in Europe.

Traditionally, members of the hospital's planning department plot isotope curves showing the amount of radiation reaching the tumor and surrounding areas. Plans of treatment are then drawn for each patient for evaluation by the consultant.

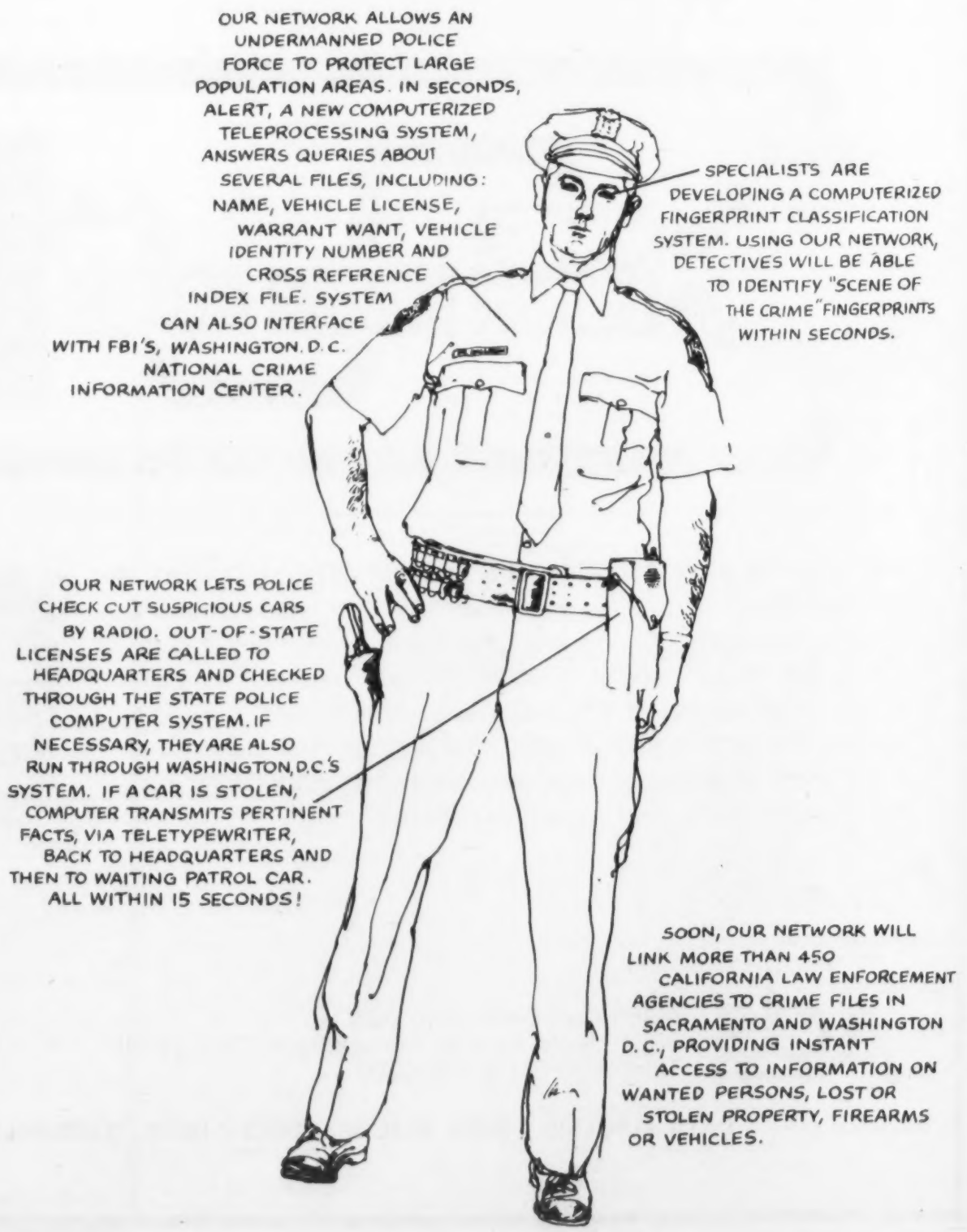
The hospital now uses a Digital Equipment Corp. PDP-8/I to plan many plots with a high degree of accuracy in a fraction of the time required by conventional methods.

Patient anatomical data are entered into the computer's memory, using an instrument called a Graphic Input Translator, or analog position transducer. This enables the size and site of a tumor to be fed into the computer merely by drawing an outline of it on the patient's chart with a pen tracer.

At the same time, this information is displayed on a cathode ray tube, and the simulated X-ray beams being used as a treatment are carefully positioned by turning knobs below the screen of the storage oscilloscope.

The computer then adds together the doses from several beams and a display in the form of isodose contours appears on the screen. Normally, this operation takes from 10 sec to 15 sec. From the resulting picture, it is possible to see immediately the dose reaching the diseased area and adjacent organs.

Many variations can be tried to obtain the desired effect, and the results can be seen instantly. When the treatment is considered satisfactory, a permanent record is printed out of a digital X-Y plotter. This final plan is checked and approved by the radiotherapist, and subsequently used by the technician in treatment.



Sicilian Water Resources Planned

ROME, Italy – A major project to increase the development and utilization of the water resources in Sicily is being assisted by information filed in the data bank of a large-scale computer here.

The project is being coordinated by the Italian Government Office for Agricultural Expansion (ESA) and the Hydraulics Institute of the University of Catania in Sicily.

Information from the files will be used to plan the integrated use of water resources for drinking, agricultural and industrial purposes in Sicily. The Sicilian project is being promoted by the National Waters Conference, a central agency involved in defining a unified "water-policy" for Italy.

All relevant bibliographical information and data concerning studies and projects as well as available data relating to hydraulic works already in existence and hydrographic information is prepared on punch cards and then entered into the memory storage of a Sperry Rand 1108 system at the Univac advanced systems computer center in Rome.

A teletype terminal installed at the ESA office in Palermo, Sicily, is linked by telephone line to the computer in Rome to allow personnel to acquire information upon request and to obtain periodic printouts of the data collected.

The Sicilian water resources project is expected to be a landmark, pilot undertaking for other similar schemes throughout Italy involving close cooperation between a cental agency, universities and industry to promote land and water development.

Computer Says Spider on 'Speed' Spins Differently From 'Straight' or LSD Type

Spider drinks hallucinogenic drug.

RALEIGH, N.C. – Ara takes LSD, gets up early each morning and spins.

Her routine seldom varies. She sips the drug from the needlepoint of a syringe and weaves for 20 minutes inside the glass and aluminum flat that is her unnatural home. Ara, her full name Araneus diadematus, is a female orb spider.

This common spider, teamed with a research scientist and a computer, is weaving a new web of knowledge about the complex behavior of man.

Are behavior patterns innate or learned? Can they be changed by enriching man's environment? Dr. Peter N. Witt, director of research for North Carolina's Department of Mental Health, seeks answers to those and other questions by studying the erratic webs spun by spiders on drugs.

Stored in the computer, an IBM 360/40, is a master web, the composite of many normal webs. Twenty-seven measurements are made from the drug-induced webs including size, shape, regularity, distance to the center, and distance between spirals.

The computer compares webs with the master and records the numerical differences.

Webs spun by normal spiders free from dust, wind and the harrassment of hungry predators are near invisible works of geometric art.

Different Webs

Webs from drugged spiders vary from normal to bizarre patchworks of holes, awkward angles and incomplete spirals.

Dr. Witt experiments with many classes of drugs including amphetamines, tranquilizers, barbiturates and hallucinogens. As a result, he is finding subtle differences in the way drugs affect the spider's brain and body.

For example, two common hallucinogens, mescaline derived from a cactus, and psilocybin from a mushroom, produce similar results when given to man. It appears they affect both mind and muscle.

The drugs cause hallucinations ranging from visions of monsters to a feeling of oneness with God, and, in some cases, slow breathing rates, heartbeat and coordination.

Webs Distinguish Effects

But after feeding the drugs to spiders and analyzing their webs, Dr. Witt concludes the drugs may not be pharmacological equals. His experiments suggest mescaline primarily affects muscle; psilocybin the brain.

On mescaline, spiders build smaller webs with less regularity in spacing, indicating coordination is impaired. On psilocybin, webs are shorter with normal spacing, indicating the spider's drive or motivation is hampered.

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Cornell Computerizes To Stop Car Crashes

BUFFALO, N.Y. – Researchers at the Cornell Aeronautical Laboratory (CAL) here are staging automobile accidents in order to prevent real ones, and will use computers to verify their tests.

Under a $100,000 grant from the U.S. Department of Transportation, CAL is developing a program to analyze and arrange accident evidence such as skid marks, direction and final positions of vehicles, damage, terrain, and human testimony.

Data will be processed, then sketched on a plotting device which will redraw the accident sequence. Information which is apparently erroneous, or contradictory, will be questioned by the computer, so that additional data, or verification of all the provided data, can be ascertained.

The researchers plan to stage automobile accidents and use high-speed photography to record all appropriate data, then feed the information into the computer.

Other researchers will then try to reconstruct the accident, using only computer output.

Protecting the 'Media'

Datafile Reconstruction Insurance Left to Unaware

By Peter F. Carr
CW Staff Writer

The majority of the computer installations in the country do not purchase insurance to protect their data files against destruction by fire or sabotage, according to the results of a *Computerworld* poll.

Although insurance to suit all the different requirements of a data processing installation is available from most of the large insurance companies, over 50% of the DP managers contacted said that they had no insurance to cover the large cost of reconstructing their files if they were accidentally or maliciously destroyed.

Since the majority of the computers in the country are leased, many users see a reference to insurance in the leasing agreement and do not pursue the matter any further, thinking they are fully covered for any catastrophe.

A spokesman for IBM said the company's official policy in its leasing agreements was that the company relieved the customer from any responsibility for all risks of loss or damage to the machines.

This agreement covers the cost of the equipment alone, the spokesman said, and does not take into consideration the destruction of the media.

"Insurance for the media is the customer's responsibility," he continued.

The spokesman emphasized, however, that IBM does not desert a customer if his data files are destroyed. The company makes every effort to assist the user in reconstructing his files in the event of a disaster for which he is not prepared.

But conceivably, without insurance to protect himself, the destruction of a system could destroy the company that owns or leases it.

For their own protection, and to meet the requirements of the insurance company, most users take precautions against loss. While the protection solution varies with need, some firms completely isolate their systems in fireproof, air-conditioned areas, and make arrangements for duplicate records at satellite locations.

But where neither elaborate security precautions nor sufficient backup facilities exist – and a large number of the installations in the country do not have sufficient backup [CW, July 15] – an accidental fire or a malicious firebomb could destroy not only the physical equipment, but also the cards, tapes, and disks on which valuable information is stored.

The reconstruction of the information on these cards, tapes, and disks is often impossible. In cases where it is possible to recover the data from source documents, the cost to the company could be huge.

The insurance available to protect users against the cost of reconstructing the media in the case of a disaster covers physical loss to all forms of media. This can include magnetic tapes, perforated paper tapes, punch cards, disks, drums, and other forms of communication related to the data processing unit.

Option of Valuing Media

The user may elect to insure all the media or only specific parts which he thinks most important and difficult to reconstruct. He usually has the option of valuing the media in two ways.

If he can establish, and wishes to set a value on an item, for example, so much per reel of tape, or so much per punch card, the insurance company will accept this valuation, and it becomes valued.

If no specific valuation is placed, the insurance company pays the actual reproduction cost.

In this case, reproduction cost means the amount it would cost to replace the media after a loss. This cost is figured not only on the basis of what it cost to originally produce the records, but the additional expense that must be incurred as a result of a loss, according to a spokesman for the Saint Paul Insurance Co., one of the first companies to offer data processing policies.

This additional expense can be quite substantial, the spokesman said, because it may involve working at another location, or on an overtime basis.

Six Categories

Most of the large insurance companies offer DP policies covering six separate categories.

In addition to insurance for the machines, and for the media, policies offer insurance for extra expenses, business interruption, valuable papers and records, and accounts receivable.

The extra expense coverage is designed to insure the extra cost incurred by conducting normal operations following damage to, or destruction of the system.

This includes the equipment and the media. Although this category appears to overlap the category concerning the media alone, an insurance company spokesman indicated that it was designed to take care of situations where all the media may not be insured, and also in situations where the machines are damaged but there is no damage to the media.

Extra Expense

"Extra expense is defined as the additional cost incurred in the operation of the business, over and above what it normally costs to operate," the spokesman said.

The business interruption category insures against losses resulting directly from the interruption of business as a result of loss or damage to the data processing system.

The valuable papers and accounts receivable categories tie into the general requirements of a firm, and can be included in the data processing contract. The valuable papers policy covers the source material plus any other valuable papers.

Accounts receivable is important, since there may be a loss of receivables due to the destruction of the records.

In arranging insurance for a data processing installation, it should be kept in mind that there is no 'standard policy.' The language of each underwriter's contract is not prescribed by any regulatory authority. Rates are a matter of judgment.

Proxmire in Pentagon Spending Critique, Says Electronic Battle 'Outrageous'

WASHINGTON, D.C. – The Pentagon has spent nearly $2 billion on a still secret computerized system to provide complete surveillance of enemy troop movements, yet the system cannot discriminate between enemy soliders and innocent civilians, charged Sen. William Proxmire (D-Wis.).

Proxmire said it was "outrageous" that the Pentagon had spent so much without a public hearing or specific Congressional authorization.

According to Proxmire, the system is known as the "electronic battlefield" and involves vast amounts of complicated electronic equipment, including computers, sensors, and lasers.

Proxmire charged that the electronic battlefield is part of an effort to develop computerized warfare methods, and could, ultimately cost $20 billion.

"The program developed out of the ill-fated McNamara Wall in Vietnam, a sophisticated electronic barrier between North and South Vietnam designed to stop North Vietnamese infiltration," Proxmire said.

But the project has two major problems, according to Proxmire.

- The system "cannot discriminate between soldiers and women and children" and when coupled with permanently placed anti-personnel weapons, "would represent a permanent menace to the civilian population."
- The computers and other equipment are extremely vulnerable "to malfunction due to rough treatment."

'Foot-in-Door'

Proxmire was particularly incensed at what he called "a classic example of the Pentagon's 'foot-in-the-door' technique. Small sums spent on research and development are escalated into billions for new weapons systems, which have never received a detailed and critical review by Congress."

After Proxmire delivered his speech, Sen. Barry Goldwater (R-Ariz.) charged that Proxmire had "sprung" an important military secret and lowered "the wall of secrecy" surrounding the project.

Proxmire denied the charge, saying that all of his information was from industry publications.

In his speech, Proxmire said that military contractors, who received a secret briefing in January, knew more about the progress than most Congressmen.

DP Analysis of Foreign Policy Soon

CW Midwest Bureau

LANSING, Mich. – Social scientists, here for Michigan State University's second annual events data measurement conference, feel that it soon will be possible to measure and analyze foreign policy matters through data processing.

The two-day meeting was organized by Edward Azar, assistant professor of political science at MSU and a member of the cooperation and conflict research group, one of the sponsors of the conference.

The main subject of the conference was the behavior of international interactions, the making of foreign policy, and the measurement of these actions by the use of data processing.

Patrick McGowan of Syracuse University said that, though he believes social scientists are "on the verge of a real breakthrough in the systematic and scientific study of foreign policy," he has some concern on the inability of social scientists to agree on a basic unit of analysis and on its implementation.

McGowan proposed that a simple, declarative sentence about foreign policy be the main unit of analysis.

MSU is currently setting up data banks on international relations.

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Editorials

'To Destroy a Reel'

"An axe is not an effective weapon against a computer, and one should not waste time bludgeoning transformers, fans, or other bulky items."

That quote is from a flier headlined "The Technology of Computer Destruction." The material, most of which is alleged to be a reprint of an article in an underground newspaper, consists of a detailed, informed discussion of how to wreck hardware and card, tape, and disk files.

For the less fiery radical, the material suggests several ways in which punched card checks and bills can be altered, preferably "by a friend who has access to a keypunch."

Since it is impossible to know how many people have read this or similar material, a DP manager can no longer assume that trouble will come carrying an axe – or even a magnet.

The "enemy" is becoming more sophisticated. Security must become more sophisticated to compensate.

'These Clouds Have Got to Clear Up Someday'

D.C. Data-Line

Garbage Specter Looming

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – It's hard to resist using an axiom of the computer business which by now has become trite.

"Garbage in, garbage out" really has meaning for the Bureau of Solid Waste Management, which is part of the Department of Health, Education and Welfare's public health service. The bureau is using computers to help it control the garbage problem in the nation.

According to H. Lanier Hickman Jr., director of the division of technical operations of the bureau, each American generates 100 lb of solid waste per day. Government, industry and individuals are spending $4.5 billion a year to collect and get rid of it.

Solid waste is also increasing at a rate of 4 lb to 6 lb a year per person due to the rise in population and the amount of additional garbage each individual is generating.

A report by the bureau has shown that the "two areas of greatest importance to the solid waste field are: first, the application of systems analysis and operations research methods, and second, the development of adequate and reliable data."

A survey was initiated by the bureau. The states collected basic data on solid waste practices, and the information was forwarded to the bureau's technical center in Cincinnati where it was verified, coded, keypunched and processed in Honeywell 400 and IBM 1130 computers.

"At present, we are involved in a pilot study to be completed by the end of June 1971," Hickman said. "The objective of this study is to determine if a data network is feasible."

'Focus Attention'

With the network, he explained, the bureau will use information received to determine changes and trends in solid waste management practices and characteristics. "It will focus our attention on areas that may need various plans and programs," he added.

The network will be monitored at various levels of government – federal, state and local.

In the initial stage, data will be collected on forms by state and local governments and forwarded to Cincinnati, much as they are now.

Alan Drattell

Ultimately, computer terminals linked to the network system may be used.

The bureau, Hickman said, already has plans to use an IBM 360/50 for various analyses. A typewriter link will connect Cincinnati with the 360/50 in HEW's complex in Washington.

"The 400 and 1130 are too small for analyses jobs," he said. "We have been using them mainly to massage [correct] data. We want to use the 360 as a predicting tool, to help us in decision making."

If President Nixon's proposed environmental protection agency (EPA) comes into being, the bureau will be moved from its present berth under HEW to EPA. "Garbage is like any other environmental problem," Hickman said. "It also represents a resource that we're throwing away."

Letters to the Editor

Would Mark II Users Like to Form a Group?

As a user of the Mark II time-sharing service, we have in the past very frequently engaged in the wishful thinking that it would be of great benefit to us if we were able to share the experiences of other users in coping with Mark II.

For this reason, I would like to explore the feasibility of forming a Mark II User's Group. The objective of this group should be to maintain communication between users relating to Mark II problems and opportunities. There is, of course, no point in forming such a group if the demand is non-existent. The purpose of my addressing this letter to you is to determine if such a need exists.

I would appreciate your publishing this letter and inviting interested readers to express their desire for participating in this undertaking by writing to: Heinz Dinter, President, Computer Management Corp., 1105 W. University Ave., Gainesville, Fla. 32601. Telephone 904-378-1615.

Heinz Dinter
President

Computer Management Corp.
Gainesville, Fla.

Recording Format Standards Needed for Tape Cassettes

Efforts to establish the best recording technique were described in the July 1 *Computerworld*, where you reported our support of the European Computer Manufacturers Association (ECMA) position to adopt phase encoding as the standard for cassette recording. Your August 5 article bemoans the lack of standards among tape cassettes.

While the adage, "A recorder is only as good as its tape," of course holds true, I believe that the standardization of the internal design of cassettes should not be the issue. Instead, the various tape manufacturers offer different design qualities in their tape cassettes.

Your chart on Page 21 illustrates the design commonality present among seven companies. Users can choose the tape cassettes to best suit their particular needs.

However, recording technique standards are concerned with the formats used to place data on tape to allow recording, playback and data interchange among various units and systems. This area requires standardization and I am pleased to note the American National Standards Institute will address this matter in the September meeting. Standardizing recording formats for cassette recorders is essential.

Variations of tape cassette qualities are healthy competition which should lead to the development of tapes to suit the needs of a wide spectrum of user applications.

E.S. Kinney, Product Line Mgr.
Tape Memories

Ampex Corp.
Culver City, Calif.

Reader Praises His Versatile 407 CAM

In your story on the System/3 in the July 29 issue, you stated "The relative lack of sophistication (of users) was perhaps shown by one user who enthused that his System/3 could do what the IBM 407 does, only faster."

Let's not be so hasty in looking down our noses at the 407. We have a 407 CAM and we find it most versatile.

As a matter of fact, we have a panel which will determine the square root of any figure up to 8 digits – and could do a larger figure, if challenged. Do you know of any System/3 which can compute square roots?

Winston Brooke
CPA, CDP

Brooke & Freeman
Anniston, Ala.

Reunion Forthcoming For Army Group

Would you please print this request for all ex-members of the 7th Army Stock Control Center to contact me at the address below for the purpose of planning a reunion. We were the first computer users in Europe with an IBM 650. I feel sure that *Computerworld* is widely circulated among the ex-members.

Robert E. Cunningham
2012 Lenox Ct. Apt. 4
Memphis, Tennessee 38116

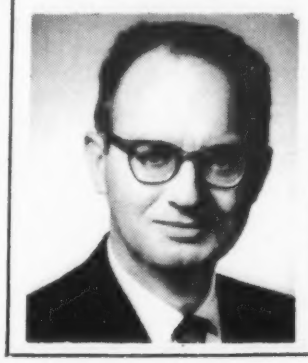
Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington Street, Newton, Mass. 02160.

Savings Can Be Over a Million!

Model 65s Not 40s, Should Be Dusted by 370/155:

The Taylor Report

By Alan Taylor



IBM's standard introductory description of its new 370/155 computer is that it is a system to succeed the current 360/40s and 50s.

Sometimes figures are produced that show that a Model 50 user can get 90% more performance for under an additional 20% in cost, and a rhetorical question is asked: "Who would not be prepared to pay such a small premium for such a large increase in productivity?"

Well, a lot of people who are finding that they have a lot less work to do in the current recession, and who are watching every penny can quickly give an answer to that one – but it's liable to be a somewhat curt one which does not really carry the discussion further.

In fact, the question can be answered more productively by rephrasing it and saying: "Who wants a productive capability of nearly twice that of the Model 50 – and is currently paying more than Model 155 prices to get it?"

When the question is put that way it becomes clear that the answer is to be found among the users of systems larger than the Model 50 rather than the users of the Model 40s and 50s, even though these are the systems that IBM is drawing our attention to.

To these larger systems the attraction will be paying less money for the same productivity; and if this is possible then it will make the 370/155 announcement very important.

Its importance will be that it will mark the point at which the hardware cost of computer installations, (which has been steadily climbing despite the equally steady and more dramatic reduction in the cost-per-computation over the years) reverses its direction and at last starts showing some decline.

This would certainly be welcome to many. The paradoxical rise in computer costs being accompanied by the constant decline in the cost-per-computation has been a danger sign to the stability of the industry for some time; and with the current recession hitting so many areas the possibility that, at last, the installation can share in the financial benefits of reduced cost-per-computation is certainly worth careful study.

So let us take a look at the Model 370/155 as a successor system for Model 65 and up.

Who Uses Model 65s?

As this inquiry is going to be user-based, it is best to start out with considering just who uses Model 65s and larger systems. It can, of course, be answered by listing their applications, saying aerospace, insurance etc. But that is not very informative.

The real answer is that the user of the Model 65 is the person who liked the System 360, but found that the Model 50 was too restrictive for his needs. So he selected the next larger system.

We can therefore characterize him as having needs that the Model 50 cannot handle, and can work from there to see whether the Model 155 can handle them – and whether there is any advantage to the Model 65 (or larger in some instances) user in letting the 155 handle them.

Core Size Doubles Cost

One of the most usual reasons why a Model 50 is considered too restrictive lies in the maximum size of core that can be attached to it – 512K bytes.

Many multiprogramming shops have found that they need more than 512K, and accordingly have chosen the Model 65 if they can do with staying at a million, or the Model 75 if they want to go over a million bytes.

In either case these users can now go to the Model 155. It handles two million bytes – and the cost per byte for Model 155 core memory is only 50 cents, as against $1.48 for Model 65 and 75 users.

Million $ Savings

On core alone therefore the saving in using the Model 155 rather than the Model 65 or 75 amounts to nearly a dollar a byte – or to around a million dollars for a million byte system.

I/O Restrictions

But, of course, not all Model 65 users went to that system to avoid the core restrictions placed on the Model 50. Some will have gone there so as to avoid the input-output restrictions.

The Model 50 did not have as many channels as the Model 65, and the channels it did have were liable to be monopolized by specific units rather than being able to be shared between different units. This meant that they were often left idle when they could have been profitably used.

The Model 155 has many more channels than the Model 50, and can use them much more efficiently. There are one or two cases where the Model 65 channels might be able to out perform the Model 155 – but very few.

For the main part anyone who went to the Model 65 to avoid the restrictions of that system's input/output will find that his needs are well filled by the Model 155.

2/3 Core Costs Saved

Now, while providing better input/output characteristics may have been the reason to select the Model 65, the financial results are found more in the core costs incurred, rather than in the costs of the additional channels.

Core costs nowadays are often more than the cost of all the rest of the processor and its I/O channels put together, particularly on systems the size of the Model 65. And, moving to the Model 65 involves using its core (at $1.48 per byte) for all your core requirements.

Therefore, the savings in going to the Model 155 come again from the reduction in the cost of the main core from $1.48 per byte to 50 cents per byte – a reduction of two thirds in what is probably the most expensive item on the system.

Alan Taylor, consultant, writer, and former editor of *Computerworld*, is president of Computer Management Aids Corp. of Framingham, Mass.

Again, the savings will range from just over half a million for the smallest Model 65, to the million mark depending on the size of the Model 65 concerned.

Processing Power Needs

Yet a third type of user who currently has a Model 65 will be one who selected it over the Model 50 because it had the processing power that is needed, and the Model 50 did not. This is quite reasonable – the Model 65 has three times the processing power of the Model 50.

Interestingly enough, so has the Model 155! In one set of comparative performance figures I have seen involving nearly 50 separate tests the Model 155 outperformed the Model 65 in 88% of the cases!

Moreover, in most of the cases where the Model 65 did outperform the 155 there are special Model 155 instructions which were not used because the tests were written so as to run on the 165s as well as the 155, so there is some doubt as to whether even in these cases the Model 155 might not at least equal the 165.

If Not Core, I/O, or Power?

Now we have looked at three big reasons for going to the Model 65 – that the Model 50 did not have the core requirements, or the I/O requirements, or the processing requirements to handle the user.

In each case we have seen that the Model 155 can handle all or almost all of the user's needs.

And in each case it allows him to cut the price of the core he uses by 65% and save, over the normal life of a system, hundreds of thousands of dollars.

This therefore indicates that the Model 155 is a true successor to the Model 65, and in some cases to the Model 75, and is well capable of handling the user's needs at a substantial financial savings.

The IBM marketing question as to which Model 40 or 50 user would not be prepared to pay such a small percentage increase to get a doubling of capacity appears to be a red herring, disguising the true nature and importance of the Model 155. If the question deserves any answer it should be by the Model 40 or 50 user saying that he was waiting for the 370/135 to show him an equivalent saving in his budget, or else he might well take his business to someone else who would provide him with suitable 1970 standard computers to replace his clearly (by IBM's own description) obsolete but expensive hardware.

And more strength to the user who gives that answer.

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Letters to the Editor

Reader Defines Problem Of Applying Technology

The Problem in the application of Computer Technology is the lack of understanding of the nature of information processing in human organizations – a lack we feel because there are so many unanswered questions – questions such as:

Why do we have files of data? Why do we create them the way we do? Why should we use a particular computer system? Why don't we use another? Why use a computer at all?

Further, how can we identify a professional information processor – one skilled in using his information processing skills objectively, scientifically, effectively?

Further, how can we identify those who understand the nature of information processing enough so that they can use computer technology to multiply the effectiveness of information processing?

Research into this area, started in 1940, has made me aware that the answer to these basic questions will resolve *The Problem* in Computer Technology.

For every human being is an information processor.

Every single program written, every computer design, every filing system, every piece of paper, every book, depends upon information processing.

Billions are spent yearly for education, for communication, for computer power without understanding the nature of the process they affect.

It was by understanding *The Problem* in the application of Computer Technology that we were able to create the Total Communication System. In so doing, we have solved the dilemma identified as Grosch's Limit and/or Grosch's Law. We have created the necessary tools to identify information processing and to train professionals in its application.

And this is the scientific, the objective, the professional way to develop and to apply Computer Technology to any organization, by understanding the nature of information processing and using the power of the computer to multiply its effectiveness.

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Researcher Tom Edsall examines a computer printout of data gathered on Lake Trout. The fish are shown in a tunnel-type respirometer, which enables reserachers to control water pressure, temperature flow rate, dissolved gasses, and vary soluable toxicants and observe fish reaction.

Computers Correlate Fish Facts, Boost Better Biological Balance

ANN ARBOR, Mich. – A computer is helping researchers here get a better look at changes taking place below the surface of the Great Lakes by analyzing and correlating data at the Great Lakes Fishery Laboratory.

The laboratory, operated by the U.S. Department of Interior, studies the effects lake pollution has had on the Great Lakes fish population.

Dr. George Y. Harry, director, said laboratory researchers rely on the computer to interpret the data being gathered both in the lab and on the lakes.

The Fishery Lab operates four research vessels on the lakes, recording data on fish population by geographical area and type, and noting biological, chemical and physical changes taking place in the water.

Researchers combine these data with "catch" information and other historical records provided by both commercial fishermen and state agencies for computer processing. The computer, an IBM 1130, correlates the data into charts for conservationists.

To establish the population size of a particular species of fish, for example, researchers enter catch information for a specific area of the lakes into the computer. It combines this information with data on the life habits of that variety and such other factors as loss to disease or to larger predators in the lakes.

The computer combines the data into a projected population for comparison with records from previous years to determine whether a certain variety is increasing or decreasing in number.

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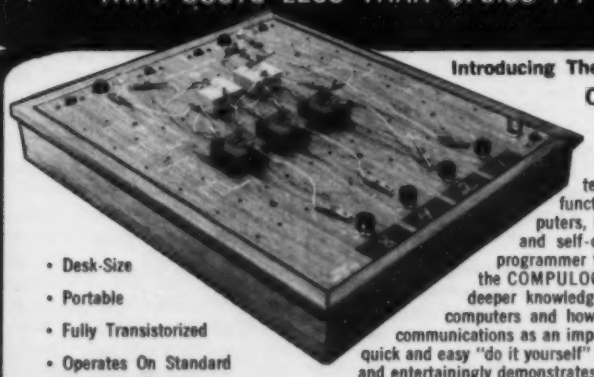

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New British City Will Grow Under Computer Aided Plan

LONDON – Having seen the current plight of cities resulting from insufficient urban planning – or the total lack of it, a group of small English communities has adopted a strategy of planned community growth, and has decided to use a computer to help monitor the progress of that plan.

The project, sponsored by the British Government, will involve the consolidation of those communities to form the New City of Milton Keynes in a 22,000-acre area midway between London and Birmingham.

The computer, a Burroughs B3500, is expected to guide the growth of the area from its present population of fewer than 50,000 to a projected 250,000 by the early 1990s.

Scheduled for installation next year, the computer will be used not only in the technical design of Milton Keynes' roads and other public works facilities, but also to monitor the socio-economic trends and requirements of its citizens.

Community service planning for Milton Keynes will encompass such factors as education, health, employment, transportation, and religious, recreational and shopping facilities.

Kenneth Wren, chief administrative and finance officer of the Milton Keynes Development Corp., refers to the whole project as "tremendously exciting, but a massive variable.

"We have a strategic plan, but this is only intended to lay the foundations of the community. A community is more than groups of buildings; it is people. As our strategy becomes reality, as foundations become homes and jobs, so we shall be monitoring the needs and views of those living here, and where necessary, we shall change course within the flexibility of our plans.

"The computer is a vital tool to aid all concerned in making the best decisions, and will ensure that we fulfill our principal objective – to build a fine city," he said.

A prominent part of the computer monitoring system will be a huge disk memory system. The disk memory will enable the city to maintain a substantial data bank of information on land, property and people. Uses will include a constantly updated evaluation of actual against planned performance, together with surveys of social trends and predictions of future requirements.

Milton Keynes' B3500 computer configuration, in addition to its large disk memory data bank, will also have a range of peripheral devices. Two Burroughs TC500 terminal computers will be linked to the system over telephone lines from Peterborough over 40 miles away.

This city is also planning for an increase in population by 100,000 in the next 15 years, and the terminal computers will enable Peterborough to use the central computer for similar work in its own growth and development.

While cities throughout the world struggle day by day with the problems that their growth has created, the New City of Milton Keynes, with the help of modern computer technology, stands an excellent chance of entering the 1990s as the planned community it intends to be.

Four Billion Computerized Facts Comprise Most Detailed Census

SUITLAND, Md. – This year's census of the U.S. population will be a complex and challenging task with more than four billion facts of information, concerning 205 million Americans, being obtained from at least 70 million incoming questionnaires – enough to fill 256 railroad box cars. Processing of the data started in mid-May and will continue until Sept. 15.

More detailed analyses of the population in specific areas will be required than ever before performed. This data will include demographic and housing information, on single city blocks, and census tracts (statistical divisions of metropolitan areas that usually contain about 4,000 persons).

Two Univac 1108s, recently acquired by the bureau, will augment its existing equipment, which includes two Univac 1107 systems.

Equipment

The automated input of the 1970 census will be done by a two-part electronic system. High-speed feeder and photographing apparatus, built in the bureau's engineering development branch, will process the completed questionnaires at the rate of two document/sec.

By using 35 cameras 16 hours each day, six days a week, the questionnaires will be photographed in about 100 days. In this process, the black dots used to record answers in pencil to questions on the census forms will be converted to white dots.

Once the forms have been photographed, 200-ft rolls of film will be processed by six film optical sensing device for input to computers (Fosdic '70) units.

The Fosdic units scan the rolls of film through a CRT beam, which triggers a photocell recording impulse from the film forms, and converts the white dots to a series of magnetic dots on tape.

The processing speed will be at the rate of more than 300 photographic frame/min. The units will be operated in three shifts a day, seven days a week, throughout the summer, to transfer 50,000 rolls of film onto 6,500 reels of magnetic tapes for input into the Univac computers.

The computers will sense the meaning of the magnetized dots on the tape and send the resulting impulses, representing facts about people and their housing, to their memory systems.

From its memory storage locations, the computer can obtain specific data, such as information on groups between 10 and 20 years of age within any city, or any section of a city such as a census tract, neighborhood, ward, etc. The computer can also relate total numbers by geographic locations, by years of school completed, training skills, and family, or individual, income levels.

By calculating percentages and medians and other statistical measures the computer can assist in weighing needs and problems of whole groups or any segment.

Similarly, characteristics of families living in poverty can be identified by relating income, occupation of family head, sex of family head, marital status, number of years of school completed.

The computer also pigeon-holes the massive national data by state, congressional district, county, metropolitan area, city, city block or down to any size needed.

The magnetic tape from the computers goes into a variety of electronic equipment to fill the varied needs of statisticians in government, private and public research organizations.

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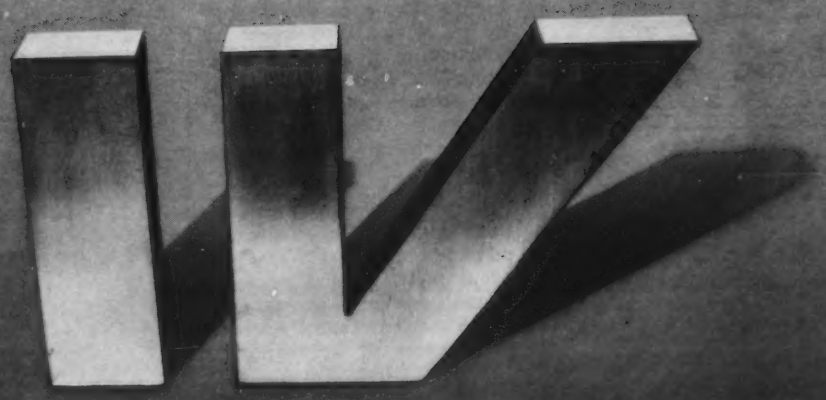
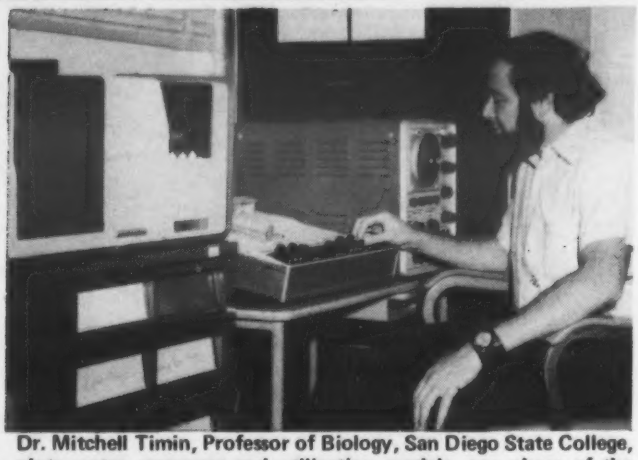
MEMOREX

FORTUNE, JUNE 1970

At least fifty U.S. companies today make minicomputers and 140 other firms turn out terminals. The field is one of great technological pioneering. For example, it is here that large-scale integration (LSI), the extension of microcircuitry beyond integrated circuits with component densities of up to 100,000 to the square inch, is finding its initial applications. Typically, a small new company, Four-Phase Systems, Inc., of San Jose, which was founded less than two years ago by Lee Boysel, then a twenty-nine-year-old computer designer, is challenging big established firms like Texas Instruments and Fairchild Semiconductor in the race to apply the large-scale integration concept to the making of small computers. Under one roof, Four-Phase Systems has assembled a group of young engineers and designers who were formerly with Fairchild Semiconductor, I.B.M., Control Data, and other companies—specialists in both large-scale integration and computer design. Cloyd E. Marvin, a Four-Phase vice president, notes that these disciplines "usually do not exist together in either computer-equipment companies or semiconductor houses." The company will soon start taking orders for a $15,000 computer.... Large-scale integration computers still have to prove themselves in a working environment. But their development is obviously setting the big-computer makers on their ears.





Dr. Mitchell Timin, Professor of Biology, San Diego State College, plots water resources and utilization models, one phase of the school's ecology studies program.

Simulation by Ecology Students Aids Study of Interactive World

CW West Coast Bureau

SAN DIEGO, Calif. – A minicomputer teams up with ecologists at San Diego State University in one of about eight centers in the country where computer technology is used to help forecast and control the effects of man's intrusion upon the natural environment.

Most of the work is concerned with population factors that affect the growth and decline of plants and animals.

In nature this is interactive – i.e., growth in coyotes means decline in rabbits, housing expansion means change in hydrology for the area, etc. Computer simulation is used to study problems of this kind.

"The most important work we are doing is training students in the use of computers for large-scale simulation of human society and its interaction with the natural world," said Prof. Mitchell Timin.

To facilitate this effort a Tempo 1 minicomputer was installed as replacement for an IBM 2780 Telecom terminal that was connected to a 360/90 at UCLA.

'Direct Interaction'

"With the minicomputer we can get direct interaction without mathematical models and use such peripherals as an analog graph plotter and an oscilloscope to view this interaction.

"Further, I am absolutely convinced that for instructional work the minicomputer is cheaper. You pay too much in overhead using a terminal.

"It is important to instructional work that you get instant access, even half an hour of delay slows the learning process. The minicomputer is also more efficient for debugging."

Tempo prepared the software to simulate the 2780 terminal so that the ecologists have their on site computer but still have access to the super scale computer for manipulation of large mathematical models.

The Tempo system consists of 8K core memory and 1-1/4 million words of disk. They expect to expand to 16K core.

Timin pointed out that there is enough technology developed now to solve problems of ecology. Computer techniques are being used in forestry work to determine how often to reseed, how many and where trees can be cut, when and where to use insecticides, and how cutting will affect water run-off and other factors.

The goal is maximum use of the forests. In fisheries it is used to simulate the spawning pattern of salmon so that quotas for commercial and private fishing can be set.

Timin summarized briefly some of man's ecology problems: "We know categorically that we will run out of petroleum reserves in 20 to 50 years. We know the pelican and many predatory birds are doomed to extinction because of the use of DDT.

"Man will probably be limited in growth by his own waste products. Many things are known. If man decides to change, the computer can point out how to do it but it can't save him. It is up to man to make the decisions."

System Manages Technical Information Vital to Formulation of Food Products

ST. LOUIS – A versatile computer system enables Ralston Purina's central laboratory here to handle a massive administrative task: managing the detailed technical information vital to formulation of many of the firm's products.

Each day, an IBM 1800 data acquisition and control system helps the research laboratory log, schedule and report on nearly 800 tests of 275 raw material samples.

Tests, called assays, determine amounts of such constituents as protein, amino acids, fats and moisture in a variety of grain and other samples. Ultimately, they help speed and improve production at the company's Chow, Checkerboard Farms, Grocery Products and other divisions.

Dr. Arvid W. Munson, manager of Research Informational Services, said the system was designed primarily to monitor the laboratory's complex equipment.

"But, our growing workload created a need for an information source to tell us how we were performing at any time.

"By making the computer an information management tool, we gained complete control over the laboratory's huge work volume.

"For the first time, we can assign definite priorities to both samples and assays, and design daily work schedules accordingly."

To build the system, Ralston Purina linked 10 typewriter-like terminals to the computer. Using these terminals, technicians record and retrieve all data concerning their work.

The laboratory can perform 255 different assays, measuring both organic and inorganic substances. It completes approximately 208,000 tests on 72,000 samples per year.

A terminal operator types grinding codes, assay information and priority codes into the computer at an average of one sample every 90 seconds. Another terminal simultaneously prints separate bottle tags for the preparation instructions and for each assay to be performed.

After the sample is ground, bottled and stored, the IBM system is signaled that the sample is ready for analysis.

Then a protein analyst, for example, can ask the system what work is waiting for him by typing at any terminal his work code, protein assay code and the number of assays he wants to perform.

The computer immediately lists the number of assays requested in priority order, a bottle tag number of each, the high and low limits for protein content in each, and the units in which he should report – usually percentages.

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Sealed bids will be received by the State Central Data Processing Authority, 508 Robert E. Lee Building, Jackson, Mississippi 39202, up until 10:00 a.m. Monday, August 31, 1970 for lease of the following data processing equipment:

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Detailed bid specifications may be obtained from the office of the State Central Data Processing Authority.

The State Central Data Processing Authority reserves the right to reject any and all bids and proposals and to waive informalities.

State Central Data Processing Authority
Charles L. Guest
August 19, 1970 **Executive Director**

Dusseldorf Data Bank to Contain International Periodical Articles

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BONN, West Germany – A philosophico-bibliographic data bank permitting comprehensive and purposeful literary research into historic and systematic sets of problems, as well as a generally applicable system for text documentation on the basis of electronic data technique, will be established and elaborated at the Philosophical Institute of Dusseldorf (West Germany) University.

A magnetic card storage will be rented for the "Operation Philosophical Documentation" with the aid of the Volkswagenwerk Foundation.

The first stage in developing this project will be aimed at collecting the entire international literature published in periodicals.

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Braves Brave Statistics

Team Gets Up-to-the-Batter Data

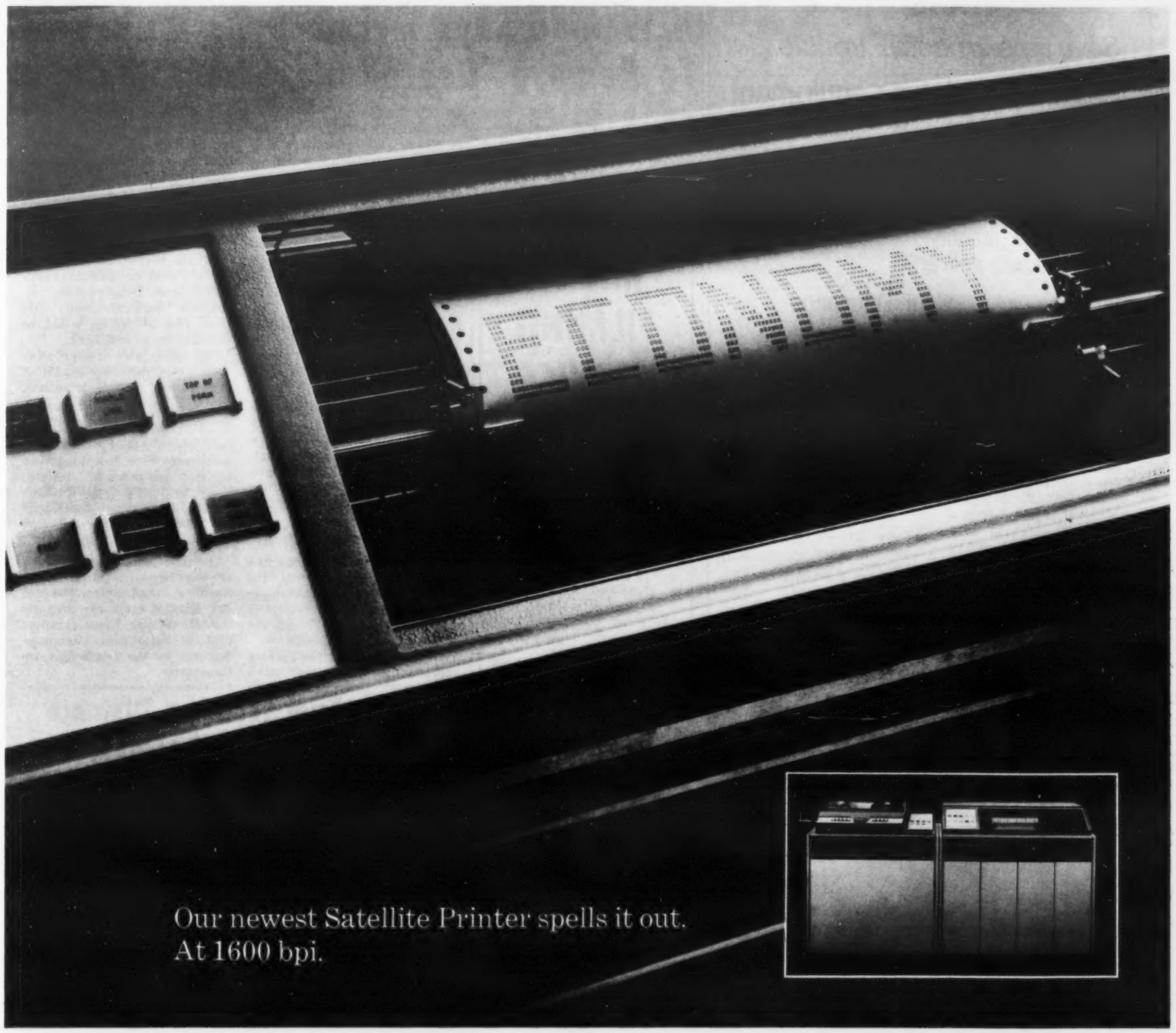
ATLANTA – Honeywell and baseball's Atlanta Braves have initiated a test program to discern the feasibility of computerized statistics in major league baseball.

All Braves 1970 individual player performance statistics for batting and pitching have been programmed into a Honeywell 1648 time-sharing computer in northeast Atlanta, and will be kept up to date on a play-by-play basis throughout the remainder of the 1970 season.

The result will be the instant availability of statistical information in the Atlanta stadium press box on any Braves player at any home game, updated through his last time at bat or last batter faced in pitching.

The Braves' new computer system will not only provide information more quickly, but will also give a greater variety of information than the standard method of computing statistics. For example, a full statistical page updated game-by-game for hitting will include more than just what a player has done in his total games. It will also show how he has done against right and lefthanded pitching and his performance records at home and on the road.

Braves statistician Dave Witter shows Atlanta slugger Rico Carty how the Braves will keep track of all batting and pitching statistical information through the use of a Honeywell time-sharing computer system.



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HEW Aide Says Income Bill's Data Bank To Remove 'Degradation' from Welfare

WASHINGTON, D.C. – The computerized data bank to be established under the guaranteed annual income plan will weed out welfare cheats and take the "degradation" out of the current welfare program, John Montgomery said recently.

Montgomery is the Department of Health, Education, and Welfare aide responsible for putting together the proposed data bank program, and for the administrative planning of it.

Invasion of privacy will not be a problem in HEW's proposed data bank, according to Montgomery.

But critics, such as the American Civil Liberties Union, disagree. The critics charge that the bill contains no provisions whatever to protect the welfare recipients' rights to privacy [CW, July 29].

The bank would, in effect, pull together information already available within the federal establishment, according to Montgomery, and would provide better control of welfare cheating than the current caseworker approach.

'Replace Visitations'

"It will replace visitations to a welfare client's home as the method of determining earnings eligibility," Montgomery said in testimony recently before the Senate Finance Committee.

He later said that the current approach is "degrading" to a welfare client.

The computer check system, Montgomery explained to the senate committee members, could be fed information from other agencies such as the Internal Revenue Service on income, wages and benefits received by welfare applicants.

But the critics have noted that the bill does not prohibit visitations, and that possibly erroneous and extraneous data from past visitations could be included in the data bank.

"We are in favor of doing away with visitations as a means of investigating welfare recipients. But setting up dossiers on individuals is no improvement.

"The invasion of privacy takes a different form, but it is still an invasion of privacy," declared Hope Eastman, assistant director of the Washington office of the American Civil Liberties Union.

The data bank is provided for in the Nixon administration's Family Assistance Plan. The plan has already been approved by the House of Representatives and is undergoing extensive hearings by the Senate Finance Committee.

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Coffman Trial for Long Distance Data Theft Is Moved to Kentucky

LOUISVILLE, Ky. – The case of U.S. vs. Mark Coffman has been transferred from the U.S. District Court, Southern District of Ohio to the U.S. District Court for the Western District of Kentucky.

Coffman was arrested recently by agents of the FBI [CW, July 29] on charges accusing him of the interstate defrauding of a Louisville time-sharing company by means of long distance telephone lines.

Coffman allegedly extracted the data of Metridata Computing, Inc. of Louisville by gaining access to the computer system using various account numbers and passwords of Metridata employees and customers.

An FBI report stated that Coffman was in the process of programming Metridata's system with a program of his own that would have by-passed Metridata's security system when he was apprehended in Cincinnati.

Coffman allegedly used long lines from Cincinnati to Louisville to extract the data.

A spokesman for the U.S. District Court in Louisville said that Coffman was bound over to the fall term of the court beginning Oct. 5. At that time, the U.S. attorney will present the case to the federal grand jury for indictment. Coffman is free on $500 bond.

Programmer Wears Habit

FRANKFURT, Ky. – Sister Vincent, wearing her white habit, commutes daily about 40 miles to her job as a programmer in the state finance department.

AUERBACH INFO, INC.

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Study

This definitive new study analyzes and projects the marketing potential, economics, and significant developments of the emerging OCR technology. It is one of a series of in-depth studies on key segments of the data processing industry prepared for the new *AUERBACH Technology Evaluation Service.*

Complete details and sample pages may be obtained by contacting:
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Cosmic Screens, Lists, Sells US-developed Software

ATHENS, Ga. – Scientific and engineering users in particular can benefit from the work of the Computer Software Management and Information Center (Cosmic), a "clearinghouse" in which software is transferred from federal government agencies to outside users, and from agency to agency with the government.

Subjects covered by programs available range from aerodynamics and biosciences, through machine elements and processes, and nuclear engineering, to structural mechanics, and thermodynamics and combustion. All programs are listed in *Computer Program Abstracts*, a quarterly publication of Nasa distributed through the Government Printing Office.

Detailed Abstracts

The abstracts are detailed, describing not only the program functions, but the program size, source language, central processor on which the program has been implemented, and the cost of the package.

The quarterly catalog also provides multiple indices, listing the programs by subject, originating source, program number/accession number, accession number/program number, and equipment requirements.

In addition to serving as a clearinghouse for software to U.S. organizations and individuals, Cosmic provides a number of related services.

If an inquirer can define a specific need or a general area of interest, for example, Cosmic said that it would search for the necessary programs, within its own library and out among the program suppliers. In addition to locating a program Cosmic said that it would assist any recipient in implementation.

A broader form of information service is also available. If a customer wants to get an idea of the difficulty of converting a program from one language to another, for example, Cosmic will research the problem and report on the possibilities.

This is a particularly valuable service, Cosmic noted, since it may have a program that would serve a customer's needs, but it is written for a different machine. In that case, the available program might either be convertible, or it might serve as a guide by which the user could develop his own program.

Cosmic said that the standards it has developed insure that the programs it lists work well and provide the results specified in the documentation. Existing errors are corrected and missing routines are added before a program is considered complete.

Cosmic also said that any updates received to programs and documentation are checked thoroughly and sent to previous purchasers of the programs.

650 Programs

Organized in 1966 at the University of Georgia, Cosmic claims to have accepted only some 600 to 650 programs out of 2,500 offered for listing by Nasa, the AEC, the Department of Defense, and other originators. Programs have also been received from universities, private industries, businesses, and other non-government sources.

The developmental costs of the Cosmic programs have already been "costed out" through the government originators. Thus the cost of the programs through Cosmic is limited to the cost of screening, proparing the documentation and source materials, and publicizing the availability of the programs.

Typical prices listed in the abstracts are $275 or $310 per program. Cosmic said that the most expensive program costs $2,000. Documentation is generally available as a separate item for each program.

Cosmic is in Barrows Hall at the University of Georgia.

Payroll Package Runs on 360s

LOS ANGELES – Companies with nationwide operations and complex employee earnings and deduction categories can use Payplus, a payroll/personnel/ system that includes federal, state, local, and foreign tax withholding and reporting capabilities.

Payplus is available from Consolidated Software Inc. (CSI), and runs on Cobol-oriented 360s with 65K of storage.

According to CSI, Payplus can process multiple companies or divisions, operating in different tax jurisdictions, in one run, and can work with employee master records that are anywere from 250 bytes up to 625,000 bytes long, to meet particular needs.

Included with the package is a Cobol Report Program Generator module. With this capability, the company said, parameter cards can be used to extract and report data in any print format, with sorting and frequency also customized to the user's needs.

Mass Changes

Another module gives the user the ability to make mass changes in every record, or only on records of a given division, without having to prepare individual transactions for each employee whose records are being altered.

Payplus is a table-driven system for voluntary deductions, taxes, and earnings categories, and for file editing and maintenance. CSI noted that the system provides for selection of up to 1,000 voluntary deductions and earnings categories.

Payplus is written in Cobol and can be implemented on any 360 having a minimum of 65K storage, three disks, and two tape drives.

CSI said that the system, which operates under either DOS or OS, could be easily adapted to other hardware, but that "rather heavy" use of packed decimal notation prevented immediate implementation on non-IBM equipment.

Module Costs

Cost of the basic Payplus system, under a licensing agreement, is $9,000 for a DOS version and $10,500 for OS. The Personnel module costs an additional $3,000, while Labor Distribution costs $2,000.

The Report Program Generator carries a $3,000 price tag, and the Mass Change module is available for $1,000. The system can be used on additional locations for 30% of the original site's costs, CSI said.

The selling price includes documentation, user manuals, on-site installation, and one year's system and tax table maintenance.

After the first year, program maintenance cost $500/yr, and tax table maintenance cost $100/yr.

Consolidated Software Inc. is at 1910 Avenue of the Stars.

Cope Units Interface With 1108 Systems

DALLAS – A software interface which allows full-duplex, remote-batch Cope processing terminals to communicate with the Univac 1108 Exec-8 operating system has been developed by University Computing Co.

The new interface is said to give Univac 1108 users access to the powerful Cope series of full-duplex terminal systems manufacturered by UCC's Data Communication Systems Division.

With the Cope controller, 1108 users are said to require less core memory because the Cope controller handles the remote terminal routines that would normally be done by the 1108.

Each controller is also said to expand the 1108's input/output capacity by operating 20 terminals or peripheral devices for each 1108 I/O channel.

Since the controller handles these peripherals, the interrupts to the standard Univac Exec-8 operating system from terminals are eliminated, thus reducing 1108 overhead, the firm said. With the new system, remote processing is handled as a part of the normal job stream in the 1108.

UCC has previously announced interfaces coupling the Cope terminals with the Univac 1108 Exec-2 system and the CDC 6000 series of computers.

An interface for the IBM 360 and 370 systems is currently being developed and is scheduled to be released in the near future, according to UCC.

The Cope/Exec-8 communications interface will be available at no extra charge to Cope users in 30-60 days, UCC said.

University Computing Co. is at 1300 Frito-Lay Tower.

'Dcap' Control Cards Help Users Generate Sales, Data Reports

NEW YORK – Users can work with a prescribed set of control cards to generate sales and data analysis reports, with the Data Count Analysis Program (Dcap), according to Advanced Computer Software Services (ACSS).

The company said that the basic function of Dcap is to tabulate values found in any data file. A maximum of four fields within a record can be distributed in one pass of the file, and any field within the record can be used.

Desired Control Breaks

Using Dcap, a statistician can specify desired control breaks, and call for the calculation of column percentages. In addition, user-supplied logic may be included if the pre-planned logic is too limited.

Basically, however, the program is designed for the non-programmer and allow for users to generate their own reports without specially written programs.

Four control cards are required in the Dcap system: data base description; report title and/or column headings desired; definition of the fields to be tabulated, and the technique of tabulation; and definition of the fields to be displayed on the report, and their print positions.

Additional control cards are required if the user wants to specify control breaks, or get automatic calculation of percentages of this column totals. Other cards are also needed if the tabulated data is to be put out on tape or disk, in addition to going to the printer.

User Coding

User coding, which must be written in PL/1, is also brought into the Dcap system through control cards. If this option is used, ACSS noted, a PL/1 assembly would be required. A company source said that this feature "feeds off" the macro-processor of the PL/1 compiler.

Dcap runs under OS/360 on a Model 40 or above and requires 40K storage and a 2311 or 2314 disk drive.

The package is available on a license agreement of a one-time charge of $2,500, or for $250/mo for a minimum of 11 months. The system can be used on additional CPU's at the same geographic location for 10% of the initial CPU charges, the company said.

The package is guaranteed and the company provides one day of on-site education and continuous systems engineering support, which can usually be handled by phone, according to ACSS.

Advanced Computer Software Services Inc. is at 220 Park Ave.

Scientific Programs Available for HP CPUs

PALO ALTO, Calif. – Installations equipped with Hewlett-Packard computers can perform general statistical analyses with a set of programs and subroutines available from the manufacturer.

Originally written for bio-statistical applications, the packages appear to be equally useful for medical research, operations research, or other analytical areas.

Among the programs are 11 routines for regression analysis, seven routines for analysis of variance, seven tests of hypotheses, three nonparametric statistics programs, 15 general statistics programs, and eight miscellaneous routines.

The programs in the statistics package were written at Goddard Computer Science Institute, and bring to over 150 the number of programs in the Hewlett-Packard contributed software library. Programs in the library are submitted by users of HP computers and are available to all HP users.

All of the statistical programs and subroutines are written in Fortran II; the subroutines are Fortran-callable.

Program tapes and documentation, including test cases, are available for $10 per program.

Hewlett-Packard is at 1501 Page Mill Rd.

System Pairs Jobs and Men

ANN ARBOR, Mich. – Shared Applications Inc. has available a computer time-sharing personnel selection system designed to assist in the placement of personnel.

The system is an information retrieval application which provides a master file of all applicants seeking placement and a file of available positions.

With the system, public and private placement agencies are said to maximize the availability and coordination of their applicants and job files, improving their effectiveness in placement.

The charge for the service consists of a $250 initiation fee plus 40 cent/min prime time and and 35 cent/min non-prime.

The company is at 209 E. Washington.

MDB/70 Can Update All Files With Single Transaction

CAMDEN, N.J. – A manufacturing data acquisition and retrieval system that features a virtually unlimited number of interrelated data combinations has been made available to Spectra users, at no charge, by RCA.

Called Manufacturing Data Base/70, or MDB/70, the software was recently introduced together with another new RCA software system, Wisdom (Wholesale Industry System for Distribution and Order Management).

MDB/70 is described by RCA as a sophisticated, communications-oriented data base system that can function in both batch and on-line processing modes.

It reportedly can be used in any application requiring extensive cross referencing of centralized data files.

By using MDB/70, the time required for system installation and program reorganization can be reduced to a fraction of that generally needed for standard bill of material processors. As a result, set-up costs and programming requirements are significantly reduced.

According to RCA, a systems programmer can learn the system in two or three days.

With MDB/70, computer users can reorganize master files without extensive restructuring of the overall system, according to RCA.

A key feature of MDB/70 is said to be its single-entry transaction capability. MDB/70 maintains files on finished goods inventory, work-in-progress, customers, vendors and other manufacturing-related categories of information. And with a single entry, all related data are updated.

Wisdom, which gives users a complete inventory-monitoring system, has two features: input editing and sequence checking of vendor with item. Wisdom's other features include quantity ordering, order point and safety stock determination, forecasting and inventory management.

Both systems are currently available.

Fund Managers Get Trust Package To Monitor Holdings, Securities

WELLESLEY HILLS, Mass. – Banks, insurance companies, mutual fund managers and others who do investment counseling can use the Eaton and Howard Personal Trust System, available from Keane Associates.

With the system, users will be able to keep account of all holdings including securities, bank accounts and other properties, Keane said.

The system was developed by Keane for Eaton and Howard, Boston investment managers, and for Investors Bank and Trust Co., also of Boston.

The system includes optimum management capabilities for counseling, and processing trust accounts and mutual funds. Accuracy of the information, ease of use and modularity are said to be the principal features of the system.

Audit Trails

It includes extensive controls and audit trails, according to the company. By providing for a separate asset description and by employing direct access methods of file handling, the system allows the user to run as many validations, edits and postings as he wants, without having to pass the entire master file.

The reports, generated on a daily basis in many cases, are said to be complete and easy to read. The portfolio analysis report, for example, provides a summary of each portfolio account and of the securities in the account. The system can be structured and expanded to meet the user's needs, Keane said.

Written in Cobol, the system requires at least a 360/25 with 48K bytes of storage and four 2311 disk drives. A Keane spokesman said the system can handle up to 1,000 accounts per disk drive. An alternate configuration would allow 4,000 accounts to be stored on a 2314 disk pack, he added.

Made up of 40 programs, the Eaton and Howard Personal Trust System sells for $25,000.

Keane Associates is at 36 Washington Street.

Cobol Ledger System

COLLEGE PARK, Md. – Delta Data Systems has developed a version of the Delta general ledger system, that is written in Cobol for a minimum configuration of the IBM 360/25 with 32K core.

New features added to the system include the ability to produce consolidated statements for multiple companies and to trigger individual companies for processing based on the company's monthly closing dates.

Available to both private users and service bureaus, the Delta general ledger system is marketed under a perpetual licensing agreement for $10,000.

Delta Data Systems is at 9903 Rhode Island Ave.

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ADS Terminals Have CRT, Keyboard, Data Storage

By Frank Piasta
CW Staff Writer

CANOGA PARK, Calif. – A series of terminals from American Data Systems (ADS) is designed for three modes of output: key-only transmission (teletypewriter replacement), batch transmission (off-line editing), and key/batch transmission (answer computer poll with key transmission,. then switch to batch mode to compose or edit off-line).

The Series 760 features a patented character generation technique using a 9 by 14 filled stroke matrix, affording, ADS said, three times the resolution of the standard 5 by 7 dot matrix. The characters are perfectly formed and extremely legible, eliminating the need for a giant screen to add bulk and take up space, the company said.

Certain models of the series of terminals afford double-size character which are said to increase operator comfort. The large characters measure 3/16 in. by 9/32 in. compared to 3/32 in. by 9/64 in. for the standard characters. Three models of the large-character terminals, ranging in capacity from 128 to 480 characters screen capacity, are available.

10 Other Models

Ten other models of the 760 are available, all using the standard character size. They vary from four to 30 display lines with a range of 32 to 80 characters per line. Screen capacities vary from 256 to 2,400 characters. All models use a nine-in. screen, measured diagonally.

The Series 760 Video Terminal is compatible with most of the communications system in use today, ADS said. For instance, using American Terminal Systems' Polling Adapter the 760 is compatible with the IBM 360, 2701 I/O and Type III terminal adapter system, directly replacing the IBM 2845-2265 configuration.

Each Polling Adapter is equipped to operate 4, 8, 12, or 16 (15 if optional hard copy interface is required) video terminals. This adapter interfaces to the I/O channel through an EIA RS232B interface. Similar interfacing is available for the IBM 360, 2703 system.

Features on the 760 which are said by ADS to save the user time and money include: a "New Line" symbol which positions the cursor at the beginning of the next line; an "End of Line" symbol which eliminates transmission of blanks; and a "Formatting" capability which allows retention of repetitive information.

Half and full-duplex data transmissions are available. Operating in asynchronous or synchronous serial mode, data rates can range from 75 to 9,600 bit/sec. In parallel mode, rates range up to 15,000 char/sec.

ADS-760 Video Communication Terminal

Two Video Outputs

Two video outputs are provided on identical but separate circuits; one is used for the self-contained CRT, the second is used as needed for remote displays.

The standard character repertoire includes all the alphabet in upper case, 0 through 9, and 25 punctuation marks and special characters. Optional character sets are available including lower case alphabet, superscript and subscript, and special symbol characters for graphic generation capability.

All editing functions are done by positioning the non-destructive cursor to the character location and actuating the appropriate keyboard control.

Unit prices for the Series 760 Video Communication Terminal range from $1,900 to $3,900 depending upon features and options selected. Quantity purchases, according to ADS, would considerably reduce the per unit cost. Standard deliveries are 90 days ARO.

American Data Systems is at 8851 Mason Ave.

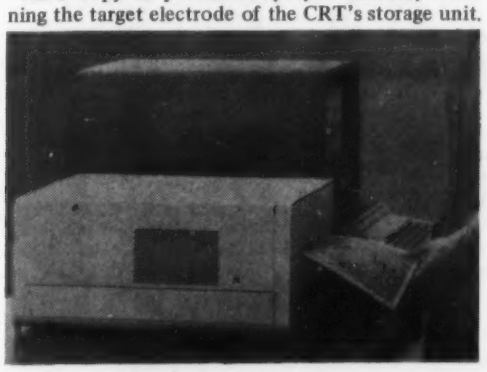
Tektronic 4601 Makes Copies From CRT, Has Manual or Remote Control Options

BEAVERTON, Ore. – A device that prints hard copies from CRT terminal outputs in less than 18 seconds will soon be available from Tektronix, Inc.

The Tektronix 4601 produces paper copies from the displays of the following Tektronix products: T4002 Graphic Computer Terminal, T4005 Graphic Display, and 611, 11-in. Storage Display Unit.

The copy command, according to Tektronix, is initiated by a local push button or by remote control for unattended operation. The signal source is "looped through" the 4601 to the Tektronix display device. When the copy command is received, the signal source is automatically disconnected from the device.

Hard copy is produced by systematically scanning the target electrode of the CRT's storage unit. An electrical signal is taken from the target electrode and fed to the line scan CRT. A fiber optic faceplate couples the light output from the CRT's screen to the recording paper. Heat development of the latent image takes place after this exposure. The first copy takes about 18 sec after initiation, with additional copies produced in about 11 sec each, the company said.



Tektronix 4601 Hard Copy Unit

The processing unit in the 4601 is designed to be used with 3M brand Type 777 Dry-Silver paper. This paper is said to provide the high image contrast required for high-resolution copies of complex graphics and alphanumerics. It offers the user the stability normally associated with wet-process photsensitive paper with the convenience of dry print-out papers, according to Tektronix.

Cost is described as low: 5 cents to 8 cents per 8-1/2 in. by 11 in. copy, depending on usage. Further economies can be realized by using smaller copies. Copy size is adjustable from 8-1/2 in. by 6 in. to 8-1/2 in. by 14 in. The paper is supplied in 500 ft rolls, 8-1/2 in. wide.

The price of the hard copy unit is $3,750, complete with one roll of paper, multipin input connector, patch cord for set-up, 6-ft detachable power cord, and instruction manual.

A lease plan for the 4601 is also available. On a one-year lease, the monthly charge would be $144.38. Longer term leases are at lower cost. Quantity discounts on both purchase and leased units are available.

First customer deliveries are scheduled for the third quarter, 1970, on a 15-week ARO schedule.

Magnetic Card Processor Gives New I/O to Minis

NEW YORK – A low cost magnetic card processor from Computer Property Corp. is intended for use with minicomputers.

The card, the size of an 80 column punch card, holds 6,144 bits or 768 bytes of data.

One third of the card or 2,048 bits are read or recorded in one pass which takes approximately one second.

A stack of cards can be read automatically and cards can be selected into either of two output stackers.

Data is stored on 12 tracks across the card and four tracks are read at one time. The loose bit density (100 bit/in.) is said to give high reliability.

The card is oxide-coated on the data storage side and is said to be reusable indefinitely. It can be written or typed upon on the other side, which is normal card stock, for identification.

The ability of the card to be read and then immediately updated, if required, is said to make it suitable for many commercial applications.

The updating capability of the magnetic card unit would require multiple magnetic tape units and the amount of data that can be stored on a card file is unlimited, the company said.

The magnetic card unit can also be used in a read-only mode for storing programs, subroutines, or tables.

The magnetic card processor is supplied with interface included. An interface for the Data General Nova has already been designed and interfaces for other minicomputers will be available, the firm said.

Price of the magnetic card processor is $5,000. Current delivery schedule is four months.

The price of the magnetic cards is 25 cents in quantity of 1,000,

Computer Property Corp. Mag Card Processor

20 cents in quantity of 5,000, less for larger quantities.

Computer Property Corp. is at 7 Dey St.

Seaco COM Unit Converts CPU Output To Microfilm at Rate of 36K Char/Sec

GARLAND, Texas – A full-feature COM recorder by Seaco Computer-Display converts computer output, either off-line or on-line, to microfilm at a rate of 36,000 char/sec (approximately four full pages).

Characters and symbols are selected from a 70-plus set and are printed on pages of up to 140 char/line, 64 line/page. The Model 401 characters are stroke-generated to produce extremely high quality and legibility of both individual characters and complete pages.

Formatting is under complete control of the operator, as is tape drive, camera, image orientation, forms flash, parity error recognition, etc.

An outstanding feature of the Model 401 is said to be the interface control panel which provides quick and easy adaptation of the system to any print tape format. No tape reformatting is necessary. Off-line input can be 7- or 9-track magnetic tape at 556, 800 or 1,600 bit/in., the company said.

The Seaco Model 401 is priced at $39,850, including a 7-track or 9-track tape transport and 16mm camera. An on-line system is furnished for the same price. Both are immediately available.

Also available are a wide variety of options, including a 7- and 9-track tape drive at densities of 556, 800, or 1,600 bit/in., forms projection and a 35mm or 105mm microfiche camera. Lease and service contracts are available.

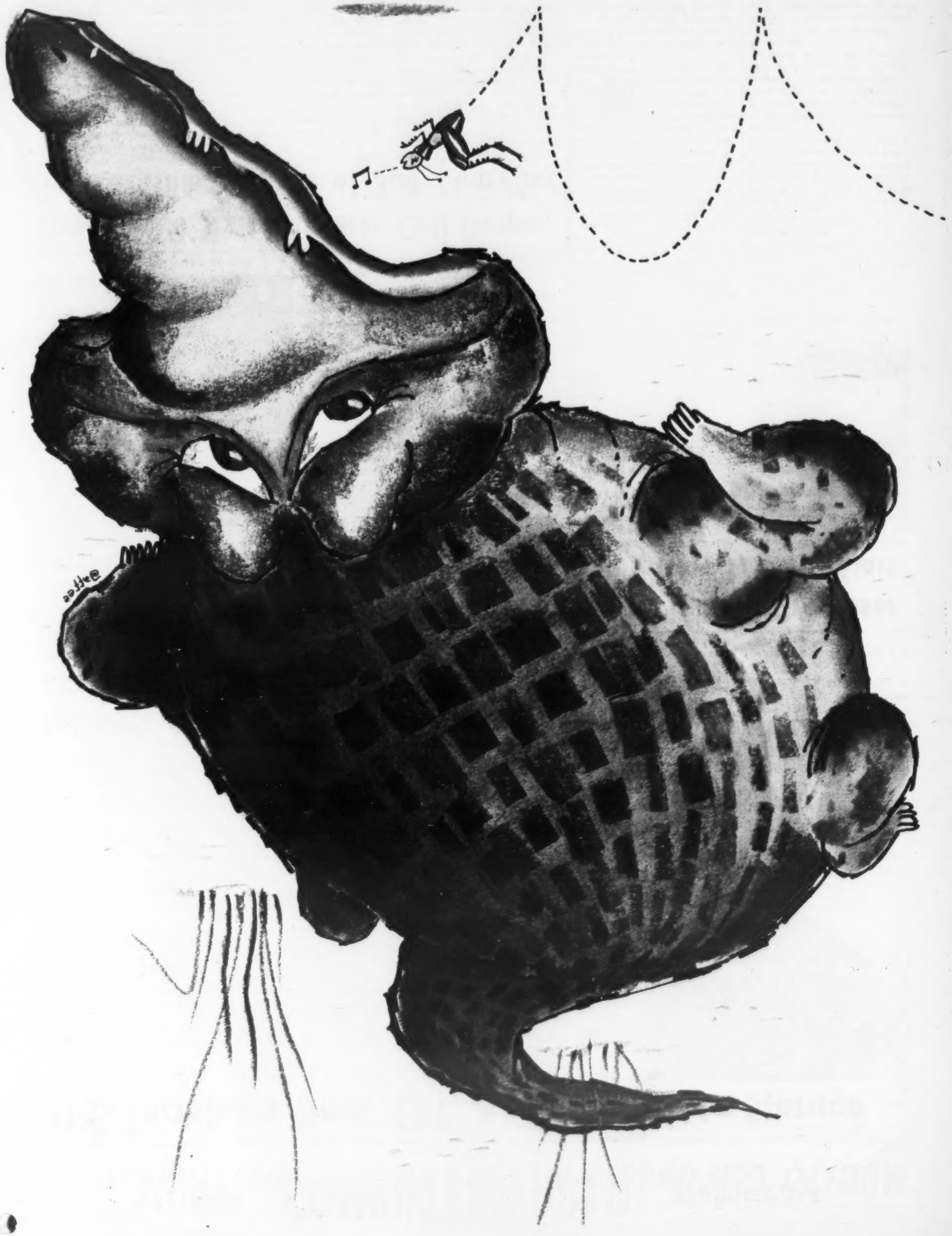
Seaco Computer-Display Inc., is at 2826 West Kingsley Road.

Regitel Printer Has TTY Interface

SAN CARLOS, Calif. – American Regitel Corp. is making available its 444CC 80-character asynchronous operator-oriented printer for applications in which a low-cost, high-speed printer is required.

The Regitel printer is available in serial, parallel or plug-to-plug compatible Teletype interface. It operates at a line speed of up to 300 baud in a character asynchronous mode with standard Ascii input.

Prices start in unit quantities of $1,600, and units are available with either friction or pin feed mechanisms. Regitel currently offers delivery of the printers in 60 to 90 days ARO.



Sluggish system?

Big computers can be made to move fast with the proper input diet.

That's why Inforex developed Intelligent Key Entry.™

Inforex feeds hungry CPU's. It does electronically what other forms of data entry do mechanically.

The Inforex system gathers data from eight keyboards into one disc memory unit. Data may be sight or key verified. Built-in logic performs check digits, left-zeros and balance totalling. Jobs are pooled onto 7 or 9-track compatible tape. Optionally, it will operate on-line directly to your central processor.

Keypunch/verifier functions. Starting with the familiar 64-character keyboard, each Inforex keystation performs all keypunch and verifier functions: Automatic check-digit computation. Automatic left zeros. No digit by digit keying is necessary. Electronic skipping and duplicating rather than mechanical. Auxiliary duplication or two additional levels of program control. Automatic + or — signing of fields.

Simultaneous entry and verification. All eight keystations input to one disc memory unit. Each keystation is assigned an area as it enters. Any keystation can access any assigned area at any time. Since each keystation has both sight and key verification capability, one keystation can verify work entered on another and if desired, verification can be done simultaneously with data entry.

Keyboard to tape functions. Inforex automatically pools input from up to eight keystations onto 7 or 9-track compatible tape. One easily entered statement transfers a series of batches. Only one keystation is required to initiate the transfer, and all keystations are functional during transfer. There are no cartridges to handle or identify, no special equipment needed for pooling.

Recallable programs. Each program has four levels of control. Once the program is keyed, it can be stored for future use and recalled by any operator merely by keying its appropriate program name. Up to 128 different program controls can be stored. There's no program card or tape mounting and no repetitive program control keying.

Self-balancing. Zero balancing is an integral part of the Inforex system. Each operator may accumulate a control total during data entry. Edit controls allow rapid correction. Adjustments to the balance total occur automatically during verification.

125-character records. With Inforex Intelligent Key Entry, the record length is variable up to 125 characters.

Full record display. For added accuracy, each keystation displays an entire 125-character record with moving cursor and position counter. The system has a forms capability that allows data entry and verification in a "fill-in-the-blank" fashion. Operator messages for direct interaction with the system along with search and paging of a file are standard.

Attractive office decor. Inforex design innovation doesn't stop with the components. Each Inforex keystation is built into an attractive contemporary walnut and black steel desk designed for operator ease and comfort. **And** remember, the system is electronic, not mechanical, allowing a quiet, comfortable atmosphere to work in.

Inforex monthly rental cost is $50 per keystation. $560 for control unit (up to 8 keystations). $960 for a complete 8 keystation system, including maintenance.

Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803 or, Inforex AG, Dornacherstrasse 210, Basel, Switzerland.

"Inforex it."

360/65 & 360/67 AVAILABLE

IPS has available for sale or lease a 360/67 system and several 360/65 systems. The 360/67 is available immediately; a short-term flexible lease can be arranged. 360/65 512K systems and CPU's are available for short-term delivery with and without I/O equipment. 360/50 systems are also available for 90 - 120 day delivery. For complete information, including prices and deliveries, please write or call.

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Sycor Terminal Analysis—Part VII

A Contrast: Sycor vs. Viatron

By Malcolm L. Stiefel
Special to Computerworld

Sycor can be characterized by its willingness, even its eagerness, to make its terminals and peripherals compatible with a user's existing equipment.

Viatron would rather lock the user in on Viatron equipment. As a result, the user with an operating system must change his interfaces and procedures, in many cases, when Viatron equipment is introduced.

The user must pay, obviously, for the kind of accommodation offered by Sycor. Sycor's equipment costs about twice as muc to buy, function for function, as Viatron's.

Cost Margin Shrinks

The cost margin is shrinking, however. Users have recently reported that Viatron no longer sells its inexpensive 2101 microprocessor. A minimum Viatron terminal (with the 2111 microprocessor) now goes for $3,840, a minimum Sycor unit for $6,600.

On a lease basis, though, they may be equal in cost, because Viatron no longer offers its low rental rates on any of its systems, and the user must rent from third parties at higher rates.

The user with relatively simple in-house data processing needs will probably benefit by dealing with Viatron, as long as he's willing to buy.

If the user needs a computer-compatible tape converter he must also be willing to wait several months for delivery.

These circumstances have apprently deterred many users who ordered, and then canceled Viatron equipment when the company switched to a purchase-only policy in May.

The more sophisticated user, with third generation computers or with some existing non-Ascii data communications setup will probably do better with Sycor.

Both Sycor and Viatron can handle Ascii communications, but Viatron is cheaper. Moreover, Viatron has few communications users at present, while some Sycor installations are already handling data at 1,200 baud.

Availability

If a source data capture and processing system is being procured, the choice will depend on the availability of Cobol or Fortran, in the user's IBM computer, for converting from Viatron's computer-compatible tape code to a code recognizable to the computer.

If the user doesn't have Cobol or Fortran, or if he doesn't have an IBM computer, then he can't consider Viatron for this sort of application.

With Sycor, the computer-compatible tape recorder, the data converter, will support eight different manufacturer's computers without any special software need.

The contrasts continue at every level of evaluation. Viatron's terminal could replace a keypunch, conceivably, because of its low cost, but Sycor's couldn't, because of its high price.

The user must supply a Selectric typewriter to work with the Viatron printing robot. Sycor's printer stands alone.

Sycor will maintain its equipment directly or through another organization (Honeywell), in 25 cities by the end of this year, in 65 cities by the end of 1971.

Viatron's maintenance is being performed by 10 Viatron-operated depots in large cities like New York, Chicago, and Los Angeles. Five other areas, like Houston and Phoenix, will be covered by fully equipped mobile vans which reportedly will visit customer locations on request.

Still other users will be served by Viatron's swarm of software-houses-turned-terminal-retailers. There is likely to be a wider variance in the quality of maintenance support seen by Viatron's customers than by Sycor's.

The Viatron customer could wind up with excellent maintenance or virtually none, depending on his location.

Through all of this, the user must keep the substantial purchase price break afforded by Viatron in his mind. The difference in price results in a difference in service and convenience, and sometimes a difference in performance.

Sycor, then, represents the Establishment in the source data terminal business. Solid, conventional engineering (using components that didn't exist 10 years ago). Conventional pricing. Conventional production techniques (which also didn't exist 10 years ago). Conventional maintenance. Useful, even powerful in remote batch applications. Ready to live in existing environments without making waves for the user. It's dull, but it works. From the user's point of view, that should be most important of all.

Malcolm L. Stiefel is an independent consultant in the area of systems design. He has had extensive computer peripheral experience.

Viatron's price increases and switch to a purchase-only policy have prompted a search for suitable alternative leased equipment. In this series, CW examines the Sycor terminal, which comes closest to Viatron's System 21 in features and cost while offering users the added capability of interfacing with major manufacturer's computers.

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Issue I4. IBM has announced the first models of System 370 and EDP Europa Report examines their likely impact on the market. The change in UK government may affect the technology based industries. The Honeywell-GE merger sets off other merger rumours. These are some of the items in EDP Europa Report Issue I4.
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Western Union Asks FCC for Satellite Data System

By Don Leavitt
CW Staff Writer

WASHINGTON, D.C. – Western Union has become the first company to file an application with the FCC to launch domestic communications satellites.

As now planned, WU's satellite system will include three satellites in "stationary" orbits; six earth stations to send, receive and distribute signals to and from the satellites; and 31 microwave relay stations to link the earth stations to WU's existing transcontinental microwave network. The proposed earth stations would be near New York, Atlanta, Dallas, Chicago, Los Angeles, and Portland, Ore.

The three satellites, one of which would effectively be a spare back-up unit, would have 9,600 voice-grade channels to carry data communications, telegrams, TWX and Telex, and voice messages. In addition, there would be 10 video channels for radio and TV broadcasts.

WU said that it could launch the first satellite within two years following FCC approval.

Subsidiary Services

WU admitted that the proposed system provided enough data transmission capacity to be useful to a subsidiary, when and if the FCC finalizes its tentative decision to allow carrier subsidiaries to offer data processing services.

In its proposal, WU also offered to work with the commission to develop means of providing "public service" benefits, including data-transmission services to educational institutions. The "raw" transmission facilities could be used, WU suggested, to link remote research sites to centralized CPUs or to gain a more complete interchange of program libraries between the institutions.

Communications

A spokesman said that, although the company would probably be required to charge something for these educational services, the cost would be minimal.

The WU proposal was the first presented to the commission since the FCC invited such filings last March 24, and it is expected that several other organizations – including American Telephone & Telegraph Co., Communications Satellite Corp. and Data Transmission Co. – will also file proposals.

Device Gives User Clear Text Data

FORT LAUDERDALE, Fla. – Security-conscious installations with teletypewriter communications links can "scramble" text in accordance with a prearranged code, prior to transmission, and "unscramble" the signal at the receiver, by using the Data Sequestor, Model JJC-3, from Ground/Data Corp.

According to the company, the unit can also be used between a CPU and a tape unit in order to "sequestor" sensitive data in coded form on magnetic tape.

In either case, the device encodes each input character in accordance with a keyed pseudo-random digital sequence. More than 500,000 code combinations are said to be possible; two are selectable at the front panel of a specific Data Sequestor.

Identical Sequestors must be used at each end of a communications link.

The encoder is compatible with Ascii networks for synchronous or asynchronous transmission. The unit can be used in half- or full-duplex mode. Switching between clear text and scrambled data is done by operating a toggle switch on the unit.

Input to the Sequestor can be from standard ASR-33 or ASR-35 Teletypes, a spokesman said. The unit can also be supplied for IBM 1050, or 2741, Friden's Flexowriter, or a similar data terminal.

Only 3 x 4 x 6 in. for the half-duplex model, the Model JJC-3 sells for $1,400

Ground/Data Corp. is at 4014 N.E. 5th Terrace.

Bell Adds Data Set Renting for $12/Mo.

NEW YORK – Installations with communications networks that include manual, full-duplex, and originate-only operations can use the Model 113A dataphone data set, now available through the operating companies of the Bell System at less than half the monthly rental of earlier data sets.

The Model 113A transmits and receives serial data at rates up to 300 baud over the telephone network and is designed to operate with telephone company or customer-provided terminal equipment.

The Model 113A can communicate with Bell 101C, 103A and 103E-type data sets used at existing Dataphone installations.

The monthly service rate for the Model 113A is in the $10 to $12 range, the company noted.

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Survey Indicates Dissatisfaction With New CDP Policy

By Harvey Elman
CW Staff Writer

NEWTON, Mass. – Members of the computer community are unhappy with the revised academic qualifications for CDP applicants set by the DPMA's Certification Council [CW, June 17].

Recent interviews with industry figures, including Commander Grace Hopper and Dr. Herbert R.J. Grosch, indicated dissatisfaction with the new policy requiring CDP applicants in 1972 to possess a Baccalaureate Degree from an accredited college or university. This stipulation does not apply to those qualified to sit for the examination, whether they applied or not, on or before the 1971 exam date.

This change in academic requirements was based on a decision of the Certification Council made in 1968.

'Or Equivalent'

"I would like that to read 'or equivalent' and would cite as an example that even the IEEE requires a four-year engineering degree or equivalent experience," said Cmdr. Hopper. There are already many people who have been in the industry for many years who lack a college degree. And, at this point because of age, these people would be barred from earning a CDP, she noted. "A degree of this nature should not be required because it will block out too many otherwise qualified people."

"This policy is very ill-advised," commented Grosch. "What the hell is so hot about college – it turns out a bunch of knuckleheads – and a knucklehead PhD. is no better than a knucklehead CDP. I'm in definite accord with an 'or equivalent experience' clause, perhaps of five to six years."

An informal CW survey of a few major users indicated that only a small percentage of the DP personnel possessed the CDP and that employers stressed that they viewed the CDP only as a plus factor for the individual, not even as a means for "getting a foot in the door."

The four-year college degree requirement was viewed as "unduly harsh" and "ludicrous." Some users intimated that almost all of their DP staffs would be wiped out by this new requirement. Blaine Berg, data systems section, Oregon Employment Division, maintained that he did not know of any EDP manager who has hired someone solely on the basis of, or even considers the CDP certificate other than as a status symbol with which to impress an employer.

Bunch of College Guys

"Statistically, I'm sure they're right that a bunch of college guys would perform better on the exam than a bundle of non-college graduates, but should you rule out the guy who is an exception? Is management on such a professional level that to obtain a management level proposition you must earn a college degree?" asked Grosch.

A recent ad placed by a "prestigious management consultant firm" in the *Washington Post*, however, asked for an applicant with an MBA, MS in Computer Science, CPA, and/or CDP for a systems design/analysis position.

The government does not require a degree for employees, noted Cmdr. Hopper. "Loads of their people are in programming without a degree who have come up through operations. Many possess two-year community college or junior college degrees.

"Acquiring a degree in a major other than computer science shows a gentility, a breadth of education. However, you can still be uncouth and still receive a CDP, or you can be broad, cultured, and a "sophisticated" college man and flunk the exam," Grosch commented. What does one have to do with the other? Some people, he noted, may even wish to earn a CDP first; then a college degree. "Just because you draw a paycheck from working near a DP group does not mean that you have learned anything, nor does having a degree."

Societies

Greater Import

Cmdr. Hopper feels that the CDP has greater import in the commercial world but is uncertain as to its effects in government work. "But it will," she stressed, "because this is just the sort of thing that government places will go for."

Grosch feels that a CDP is not worth "a great deal" in a technical computing shop, but cites its possible value for a shift manager in a "straight forward keep-the-tape-drives-warm sort of thing."

John Carey, Green Bay Packaging Inc., Green Bay, Wis., is one user who places significant value on the CDP. He is a member of the State of Wisconsin Technical Institute program, which governs trade and technical schools. His committee has recommended that the CDP be equated with a Master's Degree in DP teachers' salary schedules.

Does the industry know enough about what makes a good programmer or systems analyst or manager to establish any absolute barriers in equality levels? This was a question asked by most of the users interviewed.

Although Cmdr. Hopper cites the need for a standard means of industry certification, Grosch is pessimistic about chances for its establishment in the near future. "There is no cohesive, powerful society in this country similar to the BCS in England. If you merged the DPMA, Afips, ACM, etc. and had 100,000 to 200,000 paying members, then,... if they blew the whistle, everyone would have to listen."

Grosch feels that unity must come first, then restrictions. "A degree should be used solely as a plus, not as an absolute requirement."

October 9 Set as Deadline For SJCC Draft Material

WASHINGTON, D.C. – Original papers on computer technology and major applications of EDP systems or services are requested for the 1971 Spring Joint Computer Conference.

According to Dr. Nathaniel Macon, technical program chairman, the deadline for the initial submission of draft material is Oct. 9, 1970. All submissions and correspondence should be mailed to Dr. N. Macon, '71 SJCC Technical Program Committee, P.O. Box 30130, Bethesda, Md. 20014.

Commenting on the technical program for the SJCC, to be held May 18-20 in Convention Hall in Atlantic City, Macon stated: "The purpose of the conference is to bring together computer professionals and users of information processing technology, and to promote a meaningful dialog on important issues and significant advances.

In keeping with the conference theme of responsibility, we plan to stress those areas which reflect the responsibility of the computer field to grow in professional stature,. to continually improve its services to user organizations, and to contribute to an enhanced national life and to the well-being of the general public.

"The technical program," Macon continued, "will cover a wide range of topics with emphasis on recent progress and expected trends in hardware, software, systems, and important applications. Among topics of special interest are Caveat Emptor: Billing, Credit and the Consumer; Computers and Elections; Computers and the Media; Data Files: Plague or Panacea; Education and Training; Historical Perspectives; Law Enforcement and Judicial Administration.

Other topics are: Manpower: Needs, Sources and Future Requirements; New Technology: A Look to the Future; Techniques and Practices of Embezzlement; Teleprocessing; The Shaping of National Policies; Towards an Informed Laity; and Transportation.

"All of these topics," Macon added, "have major hardware, software and systems connotations. We seek an interplay among persons concerned. Acceptance will be based on technical importance and the potential for stimulating new ideas and fresh approaches."

In addition to the specific topics indicated, papers devoted to other areas of hardware and software are also welcome. Included are such topics as LSI, microprogramming, minicomputers, data base manipulation, user-oriented languages, operating systems, data transmission, and related categories of ongoing importance.

Instructions for Submission

Participants will be expected to deliver a well-prepared, up-to-date talk at the conference; provide an abstract for the technical program; and prepare a paper for publication in the proceedings. Acceptance is contingent on favorable evaluation by paper "referees."

Only original papers which have not been published are eligible. Necessary company and security clearances must be obtained prior to submission. Submitted papers will not be returned.

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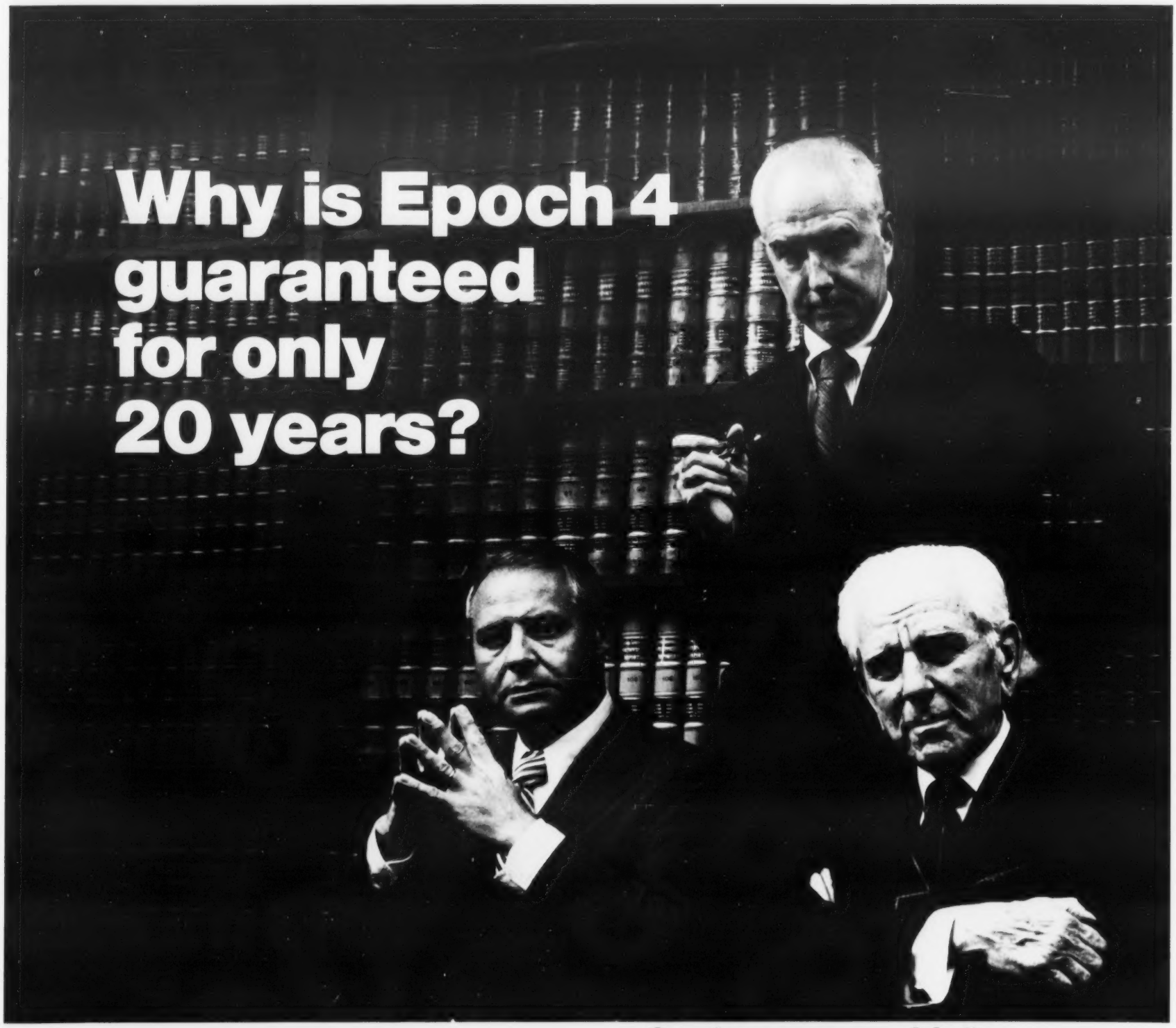

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Shakey Is Progenitor of Robots Having Artificial Intelligence

MENLO PARK, Calif. – Like most three-year-olds, Shakey appears to think a lot and remember much. But unlike others, Shakey "thinks" through two Digital Equipment Corp. computers and "remembers" mostly from a bank of large-capacity Ampex core memories. In Shakey's world, "Sesame Street" is preempted by man-made computer programs.

Stanford Research Institute (SRI) scientists, Shakey's originators, say the experimental robot is being used to develop and apply techniques in the field of artificial intelligence.

Purpose of the research is to equip electromechanical devices to perform basic tasks that normally require human intelligence – traits such as visual perception, comprehension and judgment.

Descendants of Shakey could do many jobs that are difficult, dangerous or boringly repetitive for humans, according to Dr. Charles A. Rosen, manager of SRI's artifical intelligence group in Menlo Park, Calif.

Such jobs might include undersea and planetary exploration, materials handling, and operation in environments dangerous to man.

A Little Trouble

At the present stage of development, however, such subtasks as recognizing a doorway and "knowing" what it represents and how it may be used are hard for Shakey. To do these and other jobs the robot must depend chiefly on an on-line (directly accessible) system that includes a DEC PDP-10 computer connected to a PDP-15 computer.

The PDP-10 has 160,000 words (5-1/2 million bits) of extra data storage provided by Ampex Model RG expandable core memories with 1 μsec cycle time. Data is also stored on disk and drum units.

The dual-computer system and large, on-line core data base are needed to provide quickly the complex programs that are the robot's analysis, planning, and decision-making resources.

When Shakey is on an exploration program and bumps into an obstacle which it has not previously sensed, its input devices send data to the computer system that say the equivalent of "What do I do now?" It may switch to an I'll-walk-around-it or let-me-take-a-look program, or it may run programmed data together with its new questions – any number of different programs or combinations. Thus on-line core storage is needed to give the computer fast access to the programs available for use by the robot.

TV Camera

Shakey's input devices include a Vidicon television camera, which is the robot's only "eye," and tactile wire sensors with microswitches, or "cat's whiskers." They transmit the visual and sensory signals which make possible subsequent computer analysis and use of environmental data. This incoming analog information, transmitted by the input devices to the DEC system and converted to digital data, is stored in Shakey's Ampex memory.

It is at the same time processed, categorized and perhaps put into several programs, expanding the fund of visual data as well as Shakey's repertoire of visually recognizable objects.

In addition, the robot has available other "knowledge" entered by the experimenter as symbols, a form of language better suited for logical operations.

A new task may begin with an order to go to a specified spot, transmitted by Teletype to the robot as a simple command in English. Shakey's computer programs translate the English command into the robot's own internal language.

The robot consults its previously stored fund of information about its environment, "plans" a route, and puts together a sequence of action steps designed to carry out its assigned task. New information gathered during this exercise is added to its store of "knowledge."

Most of the jobs which Shakey is struggling to master are tasks which humans perform "automatically." In terms of all-around capability, Shakey is at the stage of a two-week-old infant just opening its eyes and learning fast. A child's development quickly outpaces that of the robot. But some functions of the robot, such as use of logic and sensing, are still respectable by comparison.

Shakey's difficulty in doing even simple tasks emphasizes the complexity of the human functions which the program is trying to approximate. SRI scientists say they have gained new insight into the respect for the capabilities of the human being as a result of the research.

Despite the rudimentary level of Shakey's abilities, scientists agree the technology is here today to develop a single-purpose robot to do a specific job, if sufficient resources were available.

The SRI program, however, is determining the feasibility of a general-purpose robot, one that can work around unforeseen difficulties, without understanding them completely, and still accomplish tasks. To Shakey's credit, the robot can do simple tasks the second time around often better than most animals can.

Shakey the Robot (right) is moved into position to begin a new day of learning and decision-making at Stanford Research Institute. Shakey "thinks" through two Digital Equipment Corp. computers and "remembers" through a bank of large-capacity Ampex core memories.

Future advanced robots, either pre-programmed or partially controlled from earth and requiring no life support, might labor for days or weeks on the moon, furthering man's knowledge at relatively little expense. More sophisticated versions might operate undersea food-growing stations or mine minerals in terrain dangerous to humans.

Research in artificial intelligence is being conducted in laboratories throughout the world, with other large robot programs at Stanford University, MIT, and the University of Edinburgh in Scotland.

The question of when practical robots might result from such widespread research is not easily answered due to economics. However, scientists say consistent research and development could lead to specialized operating systems within five to 10 years, about the time Shakey and other robot ancestors are ready for museum retirement, victims of a new generation gap.

New Books

Advanced Programming: Programming and Operating Systems, by Harry Katzan Jr., Van Nostrand Reinhold Co., 278 pages plus index, $13.95.

This book serves as an introduction to advanced concepts in computer programming and systems design, provides a unified treatment of assemblers, compilers, syntactical methods, string manipulation and list processing, computer languages, and operating systems.

The book is divided into two sections – Programming Systems, which is the core of the material, and Operating Systems, which supplements and provides background material for Part I.

Chapters are devoted to a synopsis of the field of computer programming; the essential techniques of assembler programs and symbol tables; the Snobol programming language; basic techniques used in compiler writing; various computer languages such as Algol, Cobol, Fortran, and PL/1; a description of batch, conversational, and incremental compilers from a systems point of view, as well as chapters on an introduction to the structure of operating systems; and time-sharing systems design philosophy.

How to Buy Proprietary Software Products, International Computer Programs, Inc., 2511 East 46th St., Indianapolis, Ind. 46205, 63 pages, $4.50.

The subject matter of this booklet covers the present status of the software industry, guidelines and a checklist for evaluating a software package, the accounting and tax implications of software, and legal aspects of purchasable software.

Computer Seminar Directory – 1970 Edition, by Steven E. Goodman, Education and Training Associates, P.O. Box 304, Dunellen, N.J. 08812, 60 pages, $3.00.

This directory is an indexed and classified guide to more than 220 organizations (colleges and universities, professional societies, trade associations, private educational companies, government agencies, and industrial corporations) that offer seminars, workshops, short courses, conferences, and home study courses in fields related to computer and data processing technology. It includes a subject index to 165 specialized subjects as well as the names and addresses of the organizations that offer short courses in each specific field.

The Computer in Marketing, by Thayer C. Taylor, Sales Management, 630 Third Ave., New York, N.Y. 10017.

This book explains how the computer can be used most effectively by today's sales and marketing executives. Tracing the history of the computer during recent years, the book discusses management's first tentative use of early models in order-processing and billing, as well as today's complex and elaborate simulation models of the company and economy.

Written for the sales or marketing executive with no formal training in computer technology, the book defines ways and means of using the machine to best advantage.

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August 19, 1970

Japanese Market Booming...

Commerce Dept. to Push Entry of U.S. Manufacturers

By E. Drake Lundell, Jr.
CW Staff Writer

WASHINGTON, D.C. – As everyone knows, the Japanese computer market is booming, and the U.S. Department of Commerce is gearing up to aid U.S. manufacturers in their marketing efforts there.

At present, the department has recently completed an on-the-spot market survey of Japan and is planning a U.S. Computer Solo Exhibition for October 12-17, the first of its kind to be held in Japan.

The market survey shows that the following products are presently "highly marketable" in Japan: large-scale digital computers, character recognition equipment, keyboard encoders, numerical control units, CRT light sensing pen systems, and selected software and services.

Market Outlined

The Japanese economy is the fastest growing among the world's industrial nations, the Department of Commerce reports, and is expected to have 10,000 computers installed by 1972, an almost 50% increase over the 5,600 installations in September, 1969.

Domestic production of computers and peripheral equipment, which increased 148% between 1966-68, will supply a large portion of these needs, the market survey notes, but adds that the Japanese government and industry officials are aware of the technological gap between the U.S. and Japan in key areas.

The Japanese government, the department said, realizes that imports in these key categories will remain necessary in order for Japan to make up for deficiencies in domestic production, especially if the Ministry of International Trade and Industry (Miti) is to fulfill its ambition of closing the U.S.-Japan computer gap by 1980.

This realization is important, because Japan is known to be very protective of its domestic industries through a series of restrictive tariffs and import quotas in those areas that domestic industry is strong or growing.

Japan's D.P. Industry

Japanese production of computers was valued at $455 million in 1968 and will reach $1.8 billion for digital computers alone by 1975, according to Miti forecasts.

Computers presently manufactured in Japan have word lengths that range from 8 bits to 48 bits and internal memories that range from 16K to 524K, according to the Department of Commerce report. Cycle speeds range from 0.188 μsec to 7.2 μsec, the department added.

A typical Japanese system would have a word length of 42 bits, maximum internal memory of 262K and a cycle speed of 0.46 μsec, the agency claimed.

Consumption of computers in the country has risen 120% in value between 1966 and 1968. Between 1967 and 1968 alone, the value of software and services used in Japan increased from $1.3 million to over $3.6 million, the report states.

Presently, domestic production receives stimulus from the Japanese Electronic Computer

(Continued on Page 38)

ICL Lands Special Status from Russia; Appears to Have Large Lead in Market

By J.H. Bonnett
CW European Bureau

LONDON – International Computers Ltd. now appears to have the edge on all competitors in the growing Russian computer market.

The British manufacturer has received a special trading status from the protocol department of the Soviet Ministry of Foreign Trade, which allows members of the ICL staff entry into the USSR without visas.

In addition, the firm has recently completed delivery of computers valued at $4.8 million to the Soviet Union, in spite of strong pressure against the sale from the U.S.

The special trade status should mean a receptive ear in Soviet trade and government circles to future ICL computer proposals, sources indicate. Only 26 firms have ever been granted special trading status in the USSR.

With the special trade status, ICL can now open permanent offices, employ local staff, and have its own communications facilities. It is understood that ICL has already hired five Soviet nationals to complement its own resident staff of 20.

The machines in the recent delivery are all from the System 4 range and include the large-scale 4-70. Sale of this model, it is understood, was subject to considerable interference by U.S. companies and government departments on the grounds of advanced technology being passed over to the Soviet.

ICL, however, stuck to its guns, accepted the order and completed the sale, and now without doubt is the dominant supplier to Soviet central government as well as to other Soviet authorities.

The sales were completed by a sales force far smaller than the massive bank of emigre computer experts that IBM maintains in Vienna, where an engineering center is said to act primarily as a sales force for Eastern Europe.

The last four machines delivered by ICL are: a 262K System 4-70 for the Institute of Management Control; a 262K System 4-70 for the Soviet Central Planning Authority; a 262K System 4-50 for the Ministry of Merchant Marine; and a 131K System 4-50 for the State Committee of Supply.

The Institute of Management Control acts as adviser to the Soviet government on the standardization of computer systems.

It is said the institute was largely responsible for the USSR's decision to become "IBM 360 compatible." Their 4-70 configuration includes four EDS disk systems, six tapes, card and paper tape equipment and video display units. The system is heavily communications oriented and could well be the test bed for the long awaited Soviet government computer network.

Computer Operations Set To Announce Gemini Pact

COSTA MESA, Calif. – Computer Operations Inc. will announce the first order for its planned Gemini Computer within the next two months, company sources indicated recently.

The Gemini system, which is said to have two to three times the capacity of the IBM 370/165, was announced last spring and the first prototype models will be off the line in June of 1971, the firm said. The system carries a price tag of between $3 million to $12 million, depending on configuration.

The firm is directing its marketing efforts solely at IBM 360 users, especially users of 360/65s and 360 computers in the ASP configuration.

Gemini software is said to be compatible with the IBM systems, and OS 360 jobs can be run without reprogramming, Computer Operations said. The Gemini Programming Language is a proper subset of PL/1, the firm added.

The Gemini computer is a multiprocessing system organized around a large central memory complex consisting of a bulk memory and memory processor.

The Gemini memory processor is a 512-bit parallel binary computer with a bandwidth of 320 million byte/sec, the firm said.

The central processor for the unit is a 128-bit microprogrammed computer with execution rates greater than 1 million instruction/sec and a hierarchy of four operating modes.

The unit's communication processor is a 512-bit parallel binary computer which can handle up to 1,024 low-speed communications channels in groups of 64, providing asynchronous or synchronous data transmission rates from 50 baud to 9,600 baud, according to the firm.

The peripheral processor for the unit is a 512-bit parallel binary unit capable of handling 4 to 8 selector channels, providing maximum transfer rates of 5 MHz, the firm claims.

Datran Expects FCC Network Approval; Names Major Study Contract Vendors

VIENNA, Va. – Officials of Data Transmission Co. (Datran) have implemented a $7 million system integration program to ensure the compatibility of all elements in the company's nationwide common carrier data transmission network.

Initial contracts for key system elements were awarded to Collins Radio Co., Dallas; Martin Marietta Corp., Orlando, Fla.; Raytheon Co., Norwood, Mass.; and Comcet, Rockville, Md. No dollar value for the individual contract awards was announced.

Datran stated that its initial program funding was authorized as the result of tentative policy conclusions reached on July 15 [CW, July 22] by the Federal Communications Commission.

These FCC policies, although far from final, indicate that Datran's proposed network for specialized data transmission is in the public interest and would provide a desirable competitive alternative to the established communication carriers in the rapidly growing data communications industry, Datran said.

Edward A. Berg, Datran vice-president, emphasized that the system integration contracts did not assure an award for system hardware. He did say, however, that Datran has selected companies with "proven expertise" in digital communications technology in defense and space applications and that his company is putting that expertise to work to fulfill civilian needs.

Network Costs

Datran's nationwide network is expected to cost approximately $350 million and will bring low cost, highly reliable data communications service to subscribers in 35 major metropolitan areas, Datran said.

Recent market surveys indicate that the dollar volume of data transmission will exceed $2 billion by 1980 – exclusive of voice, video and picture transmission, Datran indicated.

The system integration contracts cover aspects of all three elements of Datran's nationwide digital network: a transcontinental microwave trunk which employs time division multiplexing (TDM) and digitized transmission, computer-controlled switching centers, and local distribution systems.

Commenting on the local distribution system, Berg said, "Since the FCC has shown a great deal of interest in local distribution techniques, system integration contracts have been let to supplement the considerable engineering which has already been completed to ensure a highly reliable digital transmission path between subscriber terminal locations and switching centers."

Because the location of computers and other digital-based equipment will vary in each metropolitan area, Berg said Datran will custom design local distribution systems for each city to incorporate low-power microwave, cable, and possibly optical transmission equipment.

Contracts

Martin Marietta will refine an optical transmitter/receiver which may be used in Datran's local distribution system. Martin Marietta's contract work will include comparative studies of infra-red and laser solid-state optical systems and reliability and safety studies.

Raytheon will handle the overall systems integration of Datran's proposed local distribution system, with special em-

(Continued on Page 38)

Commerce Pushing Entry into Japanese Market

(Continued from Page 37)
Co., a consortium of six manufacturers that provides a rental service to the industry and from Miti policies, the survey notes.

The Miti policies include adequate financing of manufacturers, product specialization, priority training, appointment of technicians, and a strong standardization effort in computer programs.

Role of Imports

Of the 5,600 computers installed in September 1969, only 1,465 (or 28%) were foreign-made. However, the imports accounted for 43% of the value of the installed equipment ($688 million).

Large-scale computer imports show a 71% to 29% edge over domestic manufacturers, whereas in the medium-scale categories the Japanese-manufactured products hold a 63% to 37% lead over imports. Imports of small-scale computers are negligible, according to the Department of Commerce report.

During the first half of Japan's 1969 fiscal year, total imports of computers increased by 7.8% over the same 1968 period to $111 million. More than half of that total was large-scale equipment ($5 6 million). U.S. equipment accounted for $91.3 million worth of imports in 1969.

According to the department, U.S. manufacturers will find high Japanese interest in products in the following categories:

- Super- and large-scale digital computers – Demand is rising more rapidly than domestic production. More than half of the present market is supplied by imports, most of which are of U.S. origin. U.S. technological superiority is recognized in this area.
- Character recognition equipment – Imprinters for magnetic ink characters, optically-sensed, mark sensing, magnetic ink character readers, and readers for optical characters are expected to show strong future demand.

The magnetic ink and optically sensed character imprinter market is totally supplied by imports, and interest in U.S. products is high. Mark sensing equipment, relatively new in Japan, favors technically superior U.S. manufacturers. Optical character reader demand is continuing upward with imports taking 70% to 80% of the market.

- Graphic data systems and devices – CRT light sensing pen systems and electronic handwriting systems, while currently limited in application, are judged to have high future market potential, with the Japanese showing keen interest.
- Programming services and special software – Demand is increasing but domestic supplies are either inadequate or unavailable. The Japanese are said to be trailing U.S. industry in this area and avenues for further American market penetration appear open. Demand for software is expected to reach $28 million by 1972, increasing 233% over estimated 1969 use.

Trade Show Planning

For the October trade show, which will be held at the Harumi International Fair Grounds in Tokyo, the Department of Commerce has signed up 50 firms, which will occupy 70 booths.

Datran Expects FCC Network Approval; Names Major Study Contract Vendors

(Continued from Page 37)
phasis on frequency conservation and reduction of interference in utilizing common carrier microwave bands in metropolitan areas.

Design studies for integration of microwave equipment using higher frequencies will also be included to permit use of these frequencies if they are eventually authorized by the FCC. The Raytheon study will include the complete engineering of local distribution systems for three major metropolitan areas.

Responsibility for integration of a computer-controlled switching system will be assumed by Comcet, a firm specializing in communications computers. Comcet's initial contract covers the first phase of a projected 24 month program which will include the refinement of specialized hardware, a supervisory console, early software outlines, and consulting with proposed switching matrix vendors. The Datran network initially will have 11 switching offices.

Integration of key modulation and multiple elements in Datran's transcontinental microwave trunk will be performed by Collins Radio and Martin Marietta – working in conjunction with the Datran engineering staff.

Collins Radio has responsibility for a digital modulator to be used with the trunking system. The company's initial contract includes definitive studies to obtain data for the FCC on digitized modulation, and refinements of filter design intended to minimize interference with older-type microwave systems.

A prototype modulator will be tested in the Collins laboratory before delivery to Datran's system development and engineering laboratory for field testing.

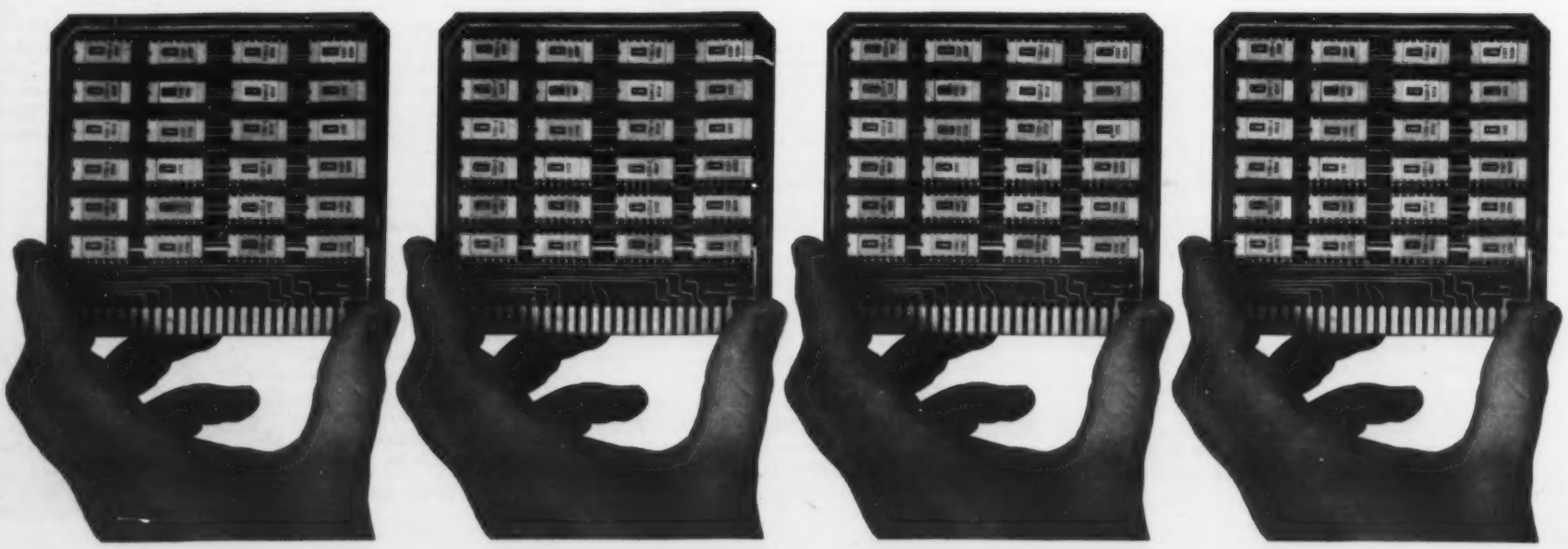
Martin Marietta will integrate a time division multiplex system for the transcontinental trunk which, when used in conjunction with the digital modulator, will permit the simultaneous transmission of over 4,000 digital channels, each with a 4,800 bit/sec rate.

Martin Marietta, which is also designing and developing an asynchronous multiplexer for use with the Defense Satellite Communications System and is building multiplexers for use in the Army Area Communications System, will integrate a prototype model of its TDM multiplex unit. The unit will be delivered to Datran for further tests.

The culmination of the systems integration program will be establishment of a test bed located at Datran's new facilities near Tyson's Corner, Va. This test bed will permit field testing of the modulation and multiplexing, switching and local distribution transmission techniques resulting from the various systems integration programs. Collins will provide microwave radio equipment for simulation of the basic trunking system.

Datran is one of the two major firms planning nationwide networks to provide services to data communications users. The other, Microwave Communications of America, Inc. is planning to have a Chicago-St. Louis transmission link in operation this fall, which will become part of a national network.

Big switch in minicomputer memories!



Mauchly to Offer 'Flowsim' Modeling System

NEW YORK – Engineers concerned with optimal plant design, development of strategies for plant operation and nonlinear models for off-line or on-line plant control can use Flowsim, a process simulation program, according to the distributor, Petrochemical Services Division of Mauchly Associates Inc.

Flowsim is available as either a generalized model system or as a complete package for modeling a specific system.

A Petrochemical spokesman claimed that most process simulators in use today employ a method of successive substitutions to solve for recycles in the heat and material balance equations.

In contrast, Flowsim uses the Newton-Raphson method to solve a set of equations, formulated by the program, which describe the process to be simulated.

The spokesman said that this approach offers solutions to problems which, up to now could not be solved. Moreover, he added, the Flowsim technique permits the user to arbitrarily specify unknown variables, which can be changed at will, while running successive case studies.

Flowsim contains a library of subroutines, any of which can be incorporated into the process flowsheet. They can perform such functions as thermodynamic data generation by the Chao-Seader method, and fractionation and absorption calculations by a fast converging rigorous method.

From input, including information describing the interconnection of all streams to all process units, external feed rates, compositions and thermal conditions, the program is said to provide complete definitions of all variables of the process flowsheet.

The Flowsim package has been implemented on the CDC 6600 and on the Univac 1108, as well as the IBM 7090. On the 6600, it requires 65K decimal words of storage.

Cost of the Flowsim package varies depending upon the user's needs, but will be about $20,000.

The Petrochemical Services Division of Mauchly Associates Inc. is at Two Penn Plaza.

Feasterville Firm Makes, Markets New IBM, Usascii Compatible Tape Drives

FEASTERVILLE, Pa. – An IBM and Usascii compatible tape drive is now available from Incor Corp. here for use in minicomputers, data terminals and off-line applications.

The drive, available in either table-top or rack mount configurations, writes data at densities of 1,600 char/in., 800 char/in., 556 char/in. or 200 char/in. in either 7- or 9-track formats, according to Incor.

Operating modes include incremental write to 1,000 char/sec, synchronous read and/or synchronous write 4 in./sec to 37-1/2 in./sec, and incremental write/synchronous read 1,000 char/sec 37-1/2 in./sec, the firm said.

The unit uses standard 1/2 in. tape on 10-1/2 in., 8-1/2 in. or 7 in. reels. A low-inertia capstan is said to ensure rapid acceleration and the unit uses an optical shaft encoder for positioning.

Power requirements for the unit are 120 Vac, 60 Hz, single phase, 5 A.

In the continuous read after write 9-track configuration, the unit is priced at $4,100 in single quantities; $3,400 each in quantities of 50, and $3,100 each in 100 unit lots. Prices for other configurations are available on request and delivery is 30 to 60 days.

Incor's mailing address is P.O. Box 156.

Honeywell Will Supply Keytapes to Defense Unit

WASHINGTON – The Defense Supply Agency, after a competitive evaluation, has ordered 58 Honeywell Keytape devices valued at $469,800 to create computer-ready data tapes for the Defense Contract Administration Services (DCAS) telecommunications system.

Thirty-three districts and offices of DCAS regions are scheduled to receive the Keytape units, which will encode contract reports onto magnetic tape for transmission to the respective DCAS regions for computer processing.

Defense Supply Agency will have a total of 108 Keytape devices on lease when deliveries are completed in December 1970. (Fifty Keytapes were ordered last winter.) The total value of Keytape equipment installed will be $2.3 million.

The digital data system being installed will connect each of the 11 DCAS regions with its districts and offices. It also will provide off-line service to the DCAS regions' Automatic Digital Network (Autodin) access.

Evans & Sutherland Eye OEM Multiplier Market

SALT LAKE CITY – Evans & Sutherland Computer Corp. will begin offering its matrix multiplier on an OEM basis. The unit is a major component of the firm's LDS-1 graphics system.

The matrix multiplier will multiply an incoming vector by a stored array and deliver the output vector in approximately 7 μsec, the firm claimed.

Local storage for three additional 4 by 4 matrices is provided for multiple transformations which may be used under program control. The unit also incorporates read-only memory control and asynchronous interfaces for linking the special processing systems.

Although the unit was originally designed for graphic processing, "there are numerous possibilities for signal processing applications," according to Jack Halvorsen, marketing director.

The firm is at 3 Research Road.

Intel LSI's replace cores at lower cost

Just tell us how much you pay for core memories and we'll show you how you make a memory for less with Intel's silicon-gate MOS devices.

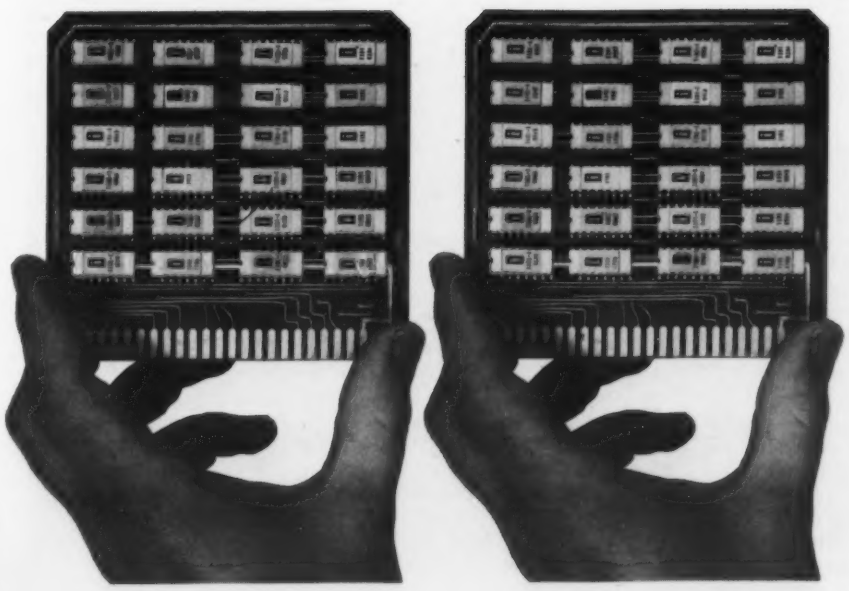
For example, the PC boards you see here are now used in a compact memory that stores 6144 bits on each card. The IC's are inexpensive Intel 1101's, a 256-bit static random-access memory that has been in volume production since August 1969.

Memories using the 1101 are extraordinarily simple to build. The device is fully decoded and can be interfaced directly with TTL and DTL logic. Unlike cores, it doesn't need clocks, output registers or sense amplifiers. And it doesn't require sensitive voltage or timing adjustments to operate properly.

For delivery on the 1101 in the U.S. phone your local Intel distributor: Cramer Electronics or Hamilton Electro Sales. If your distributor isn't stocked, just call us collect at (415) 961-8080 for immediate same-day shipment.

In Europe contact Intel at Avenue Louise 216, B 1050 Bruxelles, Belgium. Phone 492003. In Japan contact Nippon IC, Inc., Sanko-Cho Bldg., No. 53 Sanko-Cho, Shinjuku-Ku, Tokyo 160.

Intel Corporation is in high-volume production at 365 Middlefield Rd., Mountain View, California 94040.



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The Great Memory Debate — Part III

Core Continues Dominant Due to Price, Performance

By Bryan W. Rickard
Special to Computerworld

Many people do not realize to what extent the present day memory market is dominated by core.

The annual number of bits used in the U.S. is approximately 36 billion for core, 1 billion for plated wire, and 200 million for semiconductor. Other technologies account for less than 1% of the total market.

Core memory, therefore, comprises 96% of the total number of bits installed in new data processing equipment.

It isn't easy to express these figures in terms of dollars because many memory systems are made and used by the same company, and the memory cost cannot be determined separately.

Currently accepted approximations for core memory sales center around $1.3 billion a year or about 87% of the total memory system market.

These statistics illustrate a major reason for the predominant use of core memory – it is cheaper. Competing techniques get 13% of the total dollars for providing only 4% of the total storage capacity.

The traditional use of core memory is in large-scale computers. In recent years, however, other markets have developed such as minicomputers, calculators, peripherals, industrial control systems," and telephone equipment.

Off-shore manufacturing facilities have contributed to lowering core memory costs, the author claims. For example, Electronic Memories has plants in Hong Kong, Singapore, Belgium, and Mexico City.

Price Reduction

The major reason for the wider application of core is the continuous reduction in prices that have characterized the core memory industry. Core memories are now available at prices that are low enough to generate new markets in equipment for industrial control, calculators, and minicomputers.

At the other end of the scale, cost reduction has enabled large memories to break new ground in telephone equipment and mass memory uses which had previously been the province of other technologies.

Per-bit prices for million-bit and 100,000-bit core memories (roughly equivalent to current "large" and "small" memories) that were approximately 10 cents and 16 cents respectively in 1965 are around 2 cents and 8 cents now.

The advances have been made through larger scale production techniques and by the widespread use of off-shore labor.

Core memory can be made in a wide variety of configurations for different purposes. Mainframe memoires usually use 2-1/2D 3-wire techniques and operate with 800 nsec to 1.25 μsec cycle times.

Minicomputers use 3D 3-wire or 2-1/2D 3-wire configurations and usually strive for the the highest possible speed – 500 nsec to 800 nsec cycle times, while using minimum-cost circuits and components.

In calculators and industrial control applications, high speed is not a consideration, but low cost is. For this reason, small memories using 30-mil cores for low stringing cost are often used.

The large memories used in some peripherals and high-performance mass memory applications are usually 2-wire memories, for low stringing cost, operating in a 2-1/2D mode.

Such memories utilize a drive wire for sensing, which results in relatively slow operation with cycle times of more than 1 μsec.

Core memory therefore is inexpensive, versatile in performance, and adaptable to a variety of situations. Competing techniques are not so universally applicable although they have significant uses.

Plated Wire

For example, plated wire is a technology that has been touted as a possible core replacement for several years and a great deal of money has been spent on its development. Univac uses it as its preferred mainframe memory technique.

Other major computer and memory manufacturers have discarded it as being too costly to develop and produce especially in view of continually shrinking core memory prices.

Advantages of plated wire are high speed and low power. It reputedly is the answer to critics of core memory who dislike the "batch process" manufacturing methods inherent in the producton and stringing of discrete cores.

Plated wire is produced and tested in a continuous process. Unfortunately, the potentially low cost of wire production is presently far outweighed by the elaborate and critical structure in which it must be housed and the high component count of the circuits needed to drive it.

Disk and drum memory have traditionally been regarded as beyond the competitive reach of core memory because of their capability for almost infinite storage capacity at per-bit cost orders of magnitude far below that of core. This market has not been included in the statistics mentioned in the opening paragraphs.

However, with core memory offering multimillion bit storage at costs as low as a penny a bit and with access times 10^3 or 10^4 times faster than rotating systems, there is now great incentive for computers to be designed to take advantage of mass core memory.

This is the third in a series of four articles dealing with the "great memory technology debate" now taking place in the computer industry.

The previous two articles have dealt with the "newer" semiconductor and plated wire memories, and this one defines the present and future of the "old standard," the core memory.

Bryan W. Rickard is manager of magnetics engineering at the Electronic Memories Division of Electronic Memories & Magnetics Corp., Hawthorne, Calif.

While the Electronic Memories Division of the firm is solely a producer of core memories, the parent firm has an interest in semiconductor technology through its affiliate Semiconductor Electronic Memories, Inc. of Phoenix, Ariz.

Semiconductor Memory

Semiconductor memory is the most serious contender for a share of the core memory market at the present time. It comes with a great deal of built-in appeal.

Logic and power levels are compatible with the rest of the equipment and the memory comes in familiar-looking DIPs or flat-packs placed on ordinary printed circuit boards.

Speeds at last are compatible with logic circuits and they are often available from the same sources that produce the rest of the ICs in the equipment.

But there are some drawbacks. High speeds require the use of bipolar semiconductors which have a high level of heat generation. This usually involves special cooling methods and power supply considerations. MOS semiconductor memories are much better in terms of power consumption but are slower (but at about 150 nsec, still faster than core).

A disadvantage to most users is that all semiconductor memory content is "volatile" in that memory data is lost if the power goes off. (MOS will retain memory for some time without power, but eventually will lose it.) Most semiconductor memory currently in production is not random access, but is in the form of shift registers.

Presently, semiconductor memory prices are far higher than core except in the very small memory sizes of 10,000 bits and below.

Here, core element cost is outweighed by the cost of drive and sense circuits. However, semiconductor memory manufacturers are continually reducing prices and promising even lower prices to come.

Reliability

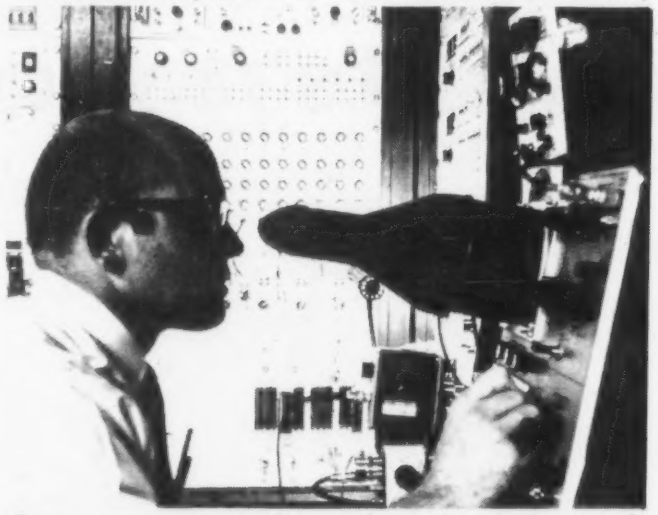
Apart from price, core memory has another significant advantage over other technologies.

People know it works.

Core has been available in substantial quantities for 15 years and has shown high reliability and continually reduced costs during that period. Its principles of operation are easy to understand and there are many qualified sources.

Together with the semiconductor switch itself, core is responsible for the very existence of the present day digital data processing industry.

The future development of the core memory industry will be determined not so much by performance improvements as by the enlargement of the available market due to changing economic trade-offs. Certainly technical advancements will take place resulting in improved performance.



Core memory costs are being reduced through the use of automatic test equipment, according to Rickard. The system shown above, built by Electronic Memories, can check thousands of cores in an array, stack or system for all significant operational parameters, EM&M claims.

Within five years, we will probably see core memories with half the cycle time possible today.

The more significant technical achievements will be in manufacturing techniques resulting in lower cost.

These improvements should extend the capabilities of core memory in low capacity applications to stave off the challenge of semiconductors and in large sizes to encroach further on the provinces of rotating memory.

The latter market, because of the high volumes involved, will serve to increase core memory production out of proportion to overall computer market growth.

Paradoxically, the increased availability and performance of ICs, and their lower cost, will help cores achieve these goals. Two-thirds of the cost of a core memory is in the electronics. (The ratio is more for small memories and less for large ones).

Price Breakthrough?

One of the most intriguing questions in the electronics industry today is whether semiconductor memory prices will ever get below the prices of core memory in the areas where the market is significant.

If they do, of course, they will probably replace core in the great majority of applications. The computer industry will find its way around small technical difficulties such as volatility if it can buy at lower prices.

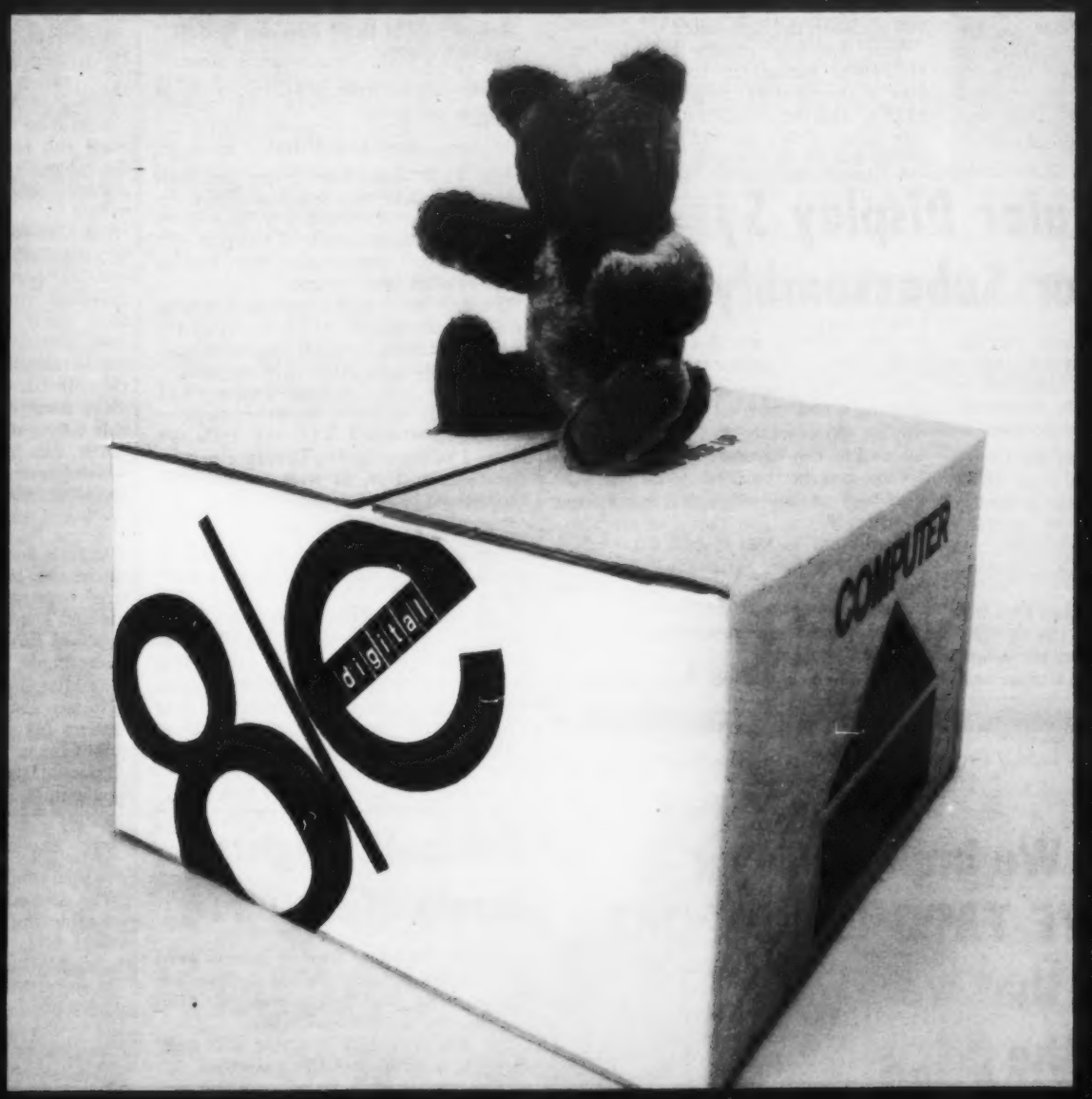
But in the foreseeable future – five to seven years – semiconductor manufacturers will probably not be able to expand their techniques and resources sufficiently fast to develop reliable mainframe memory in a quantity and at a price to seriously challenge core memory.

In 1975, it is expected that the total random access memory market will have expanded to some 250 billion bits, of which 225 billion will be core. A significant part of this market will have been "stolen" from what is currently served by sequential "rotating" memories.

The average price will be in the order of 2 cent/bit, but because the great majority of the bits will be installed in multimillion bit memory systems, probably 150 billion bits of core memory will sell at below 1 cent/bit total system cost.

By the same token, lower cost semiconductor memories should be making inroads into the lower end of the memory capacity spectrum. Obviously, there's substantial room in the future memory market for both technologies.

The new PDP-8/e:
Its own mother wouldn't know it.



The PDP-8/e is a radical departure in computer design. There's no back panel wiring – everything plugs into the OMNIBUS,™ even the CPU. In any order. It's completely flexible; you buy only what you need. And if you need more later, just buy it and plug it in. And the PDP-8/e is easier to interface and easier to maintain than old-style computers.

We've made a few other changes. Easier programming. 1.2 μ sec memory cycle time. 15 added instructions. 256 words of read-only memory. 256 words of read/write memory.

Yet there's no generation gap between the PDP-8/e and the rest of the PDP-8 family computers in 7500 world-wide installations. They all use the same peripherals (over 60 of them). They're all program and interface compatible, they all have extensive applications and documentation. PDP-8/e was born with a silver software package in its mouth.

The basic 4K machine sells for less than $5000. With teletype, less than $6500. Quantity discounts available.

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Signetics Products Include Driver, Receiver, ROM

SUNNNYVALE, Calif. – Signetics issued some new product announcements last week, including a dual line driver, triple line receiver and a 256-bit read-only memory (ROM).

The new Signetics ROM is organized to read 32 eight-bit words and is fully compatible with TTL and DTL input/output structures, the firm said.

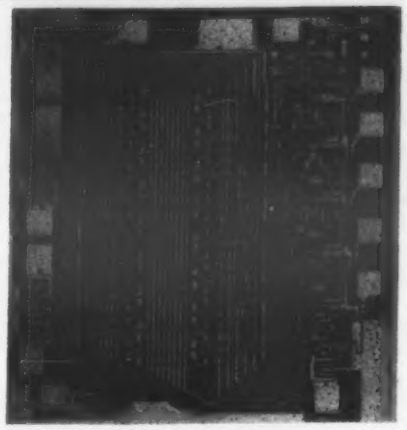
The 8224 ROM is programmed to convert the seven-bit Ascii code to the eight-bit Ebcdic code, including the conversion of letters A through Z. With the addition of gating circuitry the unit will convert both upper case and lower case letters and special patterns are also available.

During operation, words are selected by five binary address lines with full word decoding incorporated on the chip.

A chip select input is provided for decoding flexibility; it causes all eight outputs to go to the high state when it is taken high.

With the unit, maximum propagation delay time is 50 nsec and typical power dissipation is 310 milliwatt; maximum is 400 millwatt, the firm stated.

There are two models available: the S8224B is guaranteed for performance over a temperature range of -55°C to +125°C and the N8224B has a temperature range of 0°C to +75°C. The first is priced $39.80 each in over 100 quantities and the latter carries a $17 price tag in the same quantities.



Signetics 8224 ROM chip can read 32 eight-bit words.

Dual Line Driver

The 8T13 dual line driver transmits high-speed data over low impedence coaxial lines, Signetics said. The outputs are said to drive long lengths of strip line and "twisted-pair" transmission lines as high as 500 Ω, the firm claimed.

The unit has a source current capability of 75 milliamperes at 2.8 V. When the device is driving a 1,000 picofarad load, typical speed is reported to be 20 nsec.

The unit uses multiple-emitter TTL logic inputs to allow the driver to interface with standard TTL and DTL systems. The input gating structure permits the OR function as well as the AND function to be performed.

Prices Outlined

A single driver in a silicon package is priced at $2.88 when ordered in quantities of over 100.

The firm's new 8T14 triple line receiver receives high-speed digital information from long lengths of coaxial cable, strip line, or "twisted-pair" transmission lines. The receiver outputs are compatible with TTL and DTL systems, Signetics stated.

The receiver is priced at $5.33 each when ordered in quantities over 100.

Signetics is at 811 E. Arques Ave.

Lector Modular Display System Designed for Subassembly Use

MINNEAPOLIS – Tetra Corp. has developed a modular display system that is designed to be used as a subassembly in applications such as remote terminals, data display and input/output devices.

This modular display, called the Lector 1, consists of a general-purpose raster display, a memory, character generator and control electronics. The modular approach allows the use of all or any part of the display for different applications, the firm stated.

The Lector 1 has a maximum of 1,000 characters and incorporates the 62 character Ascii code. It can, with the proper output buffering, drive most storage and/or copy devices like line printers, tape decks, or similar type devices, Tetra said.

The use of a core memory allows the user to access randomly any part of the display. As standard features any character or line can be made to blink and the cursor can be controlled through the keyboard or any other device operating the display.

As options to this system a keyboard, display enclosure, various interfaces, several character sets, and sharing of the display's memory are available.

Prices for the modules in quantity range to $1,150.

Tetra Corp. is at 7309 Washington Ave.

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National's Register Breaks 1Cent/Bit

SANTA CLARA, Calif. – A new MOS shift register from National Semiconductor Corp. has broken the 1 cent/bit price barrier in OEM quantities.

The MM5016, 512 dynamic shift register sells for $5 in over 100 quantities.

The unit, which operates on a standard +5 and -12 power supply, is completely bipolar compatible, the firm said, and is expected to stimulate sales in the commercial memory market.

Replacement Seen

The unit is said to be an economic replacement for glass and magnetrostrictive delay lines and drum memory storage. In addition, National said, it provides low-cost CRT refresh memory and long serial memory at a competitive price.

The device offers 600 Hz guaranteed minimum operating frequency at 25°C and an output tap at the 500th bit. It is also available in either TO-5 or dual in-line packages.

'Second Generation'

A member of National's "second generation" bipolar compatible MOS family, the unit does not require any pull up or pull down resistors on the input or output.

The OEM prices for the unit are as follows:

Unit	Package	1-24	100-999
MM5016	TO-5	$15	$5
MM5016D	DIP	$24	$16
MM4016	TO-5	$30	$20
MM4016D	DIP	$36	$24

National Semiconductor is at 2900 Semiconductor Drive.

Channel Access, Printer Devices Out at Capital

DAYTON, Ohio – Capital Computer Corp. is now marketing a Channel Access Module for use with the IBM 360 and a Printer Control Adapter to simulate the IBM 2821 control unit for the 1403 line printer.

The new access module, the CAM/360-0, contains all of the hardware to interface with any I/O channel, selector or multiplexer, of any Model 30 through 195 System 360, the firm said.

Compatibility

It reportedly provides complete electrical and mechanical compatibility with the channel hardware, but leaves the designer free to use whatever logic he wishes.

The CAM/360-0 also contains the necessary hardware to interface with the System 360 power control system, including provision for powering up or down in local mode, on-line and off-line operation, and detection of the not-ready to ready transition. A special circuit is provided in the CAM/360-0 to minimize the delay involved in propagating Select signals during device selection, so the CAM/360-0 can be used to interface devices which must be installed at a distance from the 360.

Addressing

Address and command decoding are left to the user in the CAM/360-0 leaving him free to attach any type of equipment he desires. The range of devices that may be attached through the CAM/360-0 extends from simple, single-function units, such as a printer controller, through complex systems, such as communications controllers for may groups of lines of different types.

Price of the CAM/360-0 is $1,935 for single units. Delivery is 60 days ARO.

Printer Control

The new printer control adapter is designed for the company's CAM/360-0.

The new adapter, the Model PCA/1403, contains the logic necessary to simulate IBM's 2821 control unit for the 1403 high-speed line printers the firm reported.

Manufacturers of line printers, computer-output-to-microfilm (COM) devices, and other output devices can use the CAM/360-0 with the new adapter to attach their equipment to the IBM 360 computers. Any device so attached appears to be a standard IBM printer, and can use all of the software provided by IBM for use with its printers without conversion.

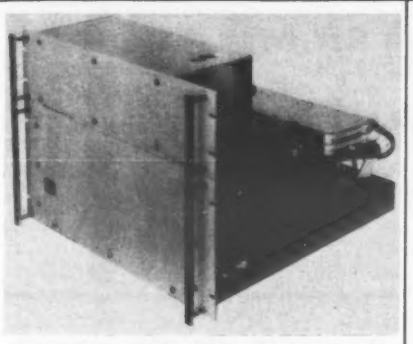
The standard PCA/1403 contains command decoding logic for all the normal printing, spacing, and skipping functions of the IBM 1403 printer, as well as providing the Status and Sense registers required for software compatibility. Two options are available to extend this capability. Option 1 provides logic and control circuits necessary to add the Universal Character Set (UCS) commands, and Option 2 provides the builder of a buffered output device with the Diagnostic Write and Diagnostic Read commands which are used to locate errors in the buffer hardware.

Options

With both options installed the PCA/1403 will respond to every printer command recognized by the IBM Model 2821 control unit. Neither option is required, however, for compatibility with IBM operating systems and application programs.

The price of a CAM/360-0 with the PCA/1402 installed is $5,305 for single units, with delivery in 60 days. Each option adds $750 to the price of the basic unit.

The firm is at 18 Mackoil St.



Data Disc 7207 Disk Memory and Power Supply

Data Disc Shows Largest OEM Set In 7200B Family

PALO ALTO, Calif. – The newest member of the 7200B series of disk memories from Data Disc, the 7207 Disk Memory, has the largest capacity of any unit yet offered by that company.

Intended primarily for the OEM buyer, the head-per-track device has 128 heads with an average access time of 16.7 msec. The 12-in. disk has a capacity of 12.8 million bits. The serial data rate to and from the disk is three Mbit/sec.

The 7207 is said to be plug-compatible with other Data Disc memories – which allows field expansion of the memory without danger of data loss.

All interface lines are the same; only one additional line has been added to double the track address capability. The 7207 comes with a power supply which has memory protect circuits to prevent data loss in case of power interruption.

Three clocks – track origin, sector, and read/write – are provided. The drive is equipped with the necessary electronics to enable the user to write his own sector clock track. Alternately, Data Disc will provide the track written to the customer's specifications.

The 7207 is now one of six capacities offered in the 7200B memory line. Other models and their capacities are:

- 7202B – 560K bits;
- 7203B – 800K bits;
- 7204B – 1.6 million bits;
- 7205B – 3.2 million bits; and
- 7206B – 6.4 million bits.

All models are packaged in the same 8-3/4 in. rack mounting which is said by Data Disc to make expansions of memories easier.

Unit quantity price is $17,000 and OEM quantity price as low as $11,000, in lots of 100 or more. A two-year warranty applies to the 7207. Delivery is 30 days ARO for small quantities and 90 days ARO for larger quantities.

Data Disc is at 1275 California Ave.

Endless Loop Series Of Tape Transports Planned From Acron

LAKEWOOD, N.J. – Acron Corp. is making its series of endless loop tape transports available for OEM buyers.

The units were first developed for the firm's line of security dialing and reporting systems, but are expected to find use in such applications as computer memory programming or loading, digital test devices, and machine load-up by putting serial information on the transport.

Of the three basic models, the TD-100 has a 6 V mechanically governed motor; the model TD-100 a 110 V, 60 Hz synchronous motor, and the TD-120 a 12 V brushless speed control unit.

The units weigh approximately 1-1/2 lb and measure 3-3/4 in. by 6-3/4 in. by 2 in. The units are available from stock.

The firm is at 209 River Ave.

Hughes Aircraft Introduces Military Computer; Applications Expandable to Meet Growth Need

FULLERTON, Calif. – A computer designed by Hughes Aircraft Co. to meet the requirements of military command and control applications can be expanded to satisfy growth requirements.

The H4400 is expanded by including up to eight processor modules, and a maximum of 16 memory modules per computer.

Such a system, according to a Hughes executive, is capable of more than 4 million operation/sec, and can store more than 8.5 million bits of information. Performance options such as floating point arithmetic are available within each module.

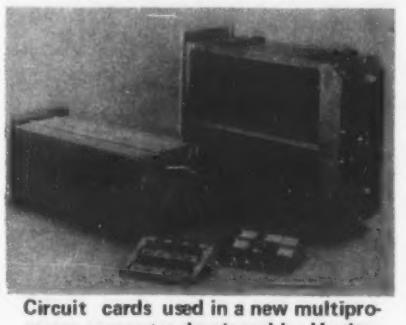
Other features of the Hughes computer, described by the manufacturer as becoming essential in military systems, are:

- A self-contained diagnostic system to permit the computer to locate automatically a fault within itself and isolate it down to a single circuit card.
- Automatic reassignment of a malfunctioning module's tasks to another module of the same type.
- Extensive use of medium- and large-scale integrated circuits.
- Reduced program execution time by means of hardware-implemented special instructions which can replace subroutines.

Module types include an arithmetic control processor, input-output processor and a memory module. All are interconnected by an expandable switch module that routes data between the processors and memories.

This method of interconnection is said to reduce total cabling requirements because only a single cable connects each module to the system.

The instructions of the arithmetic control processor are controlled by a microprogrammed ROM. This device – an LSI circuit containing 2K bits – allows the addition of up to 24 special macroinstructions to the system.



Circuit cards used in a new multiprocessor computer developed by Hughes.

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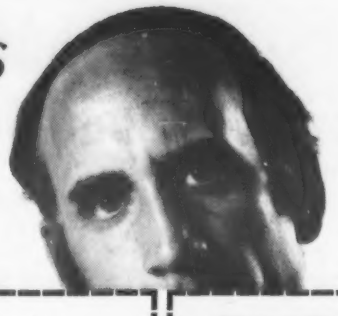

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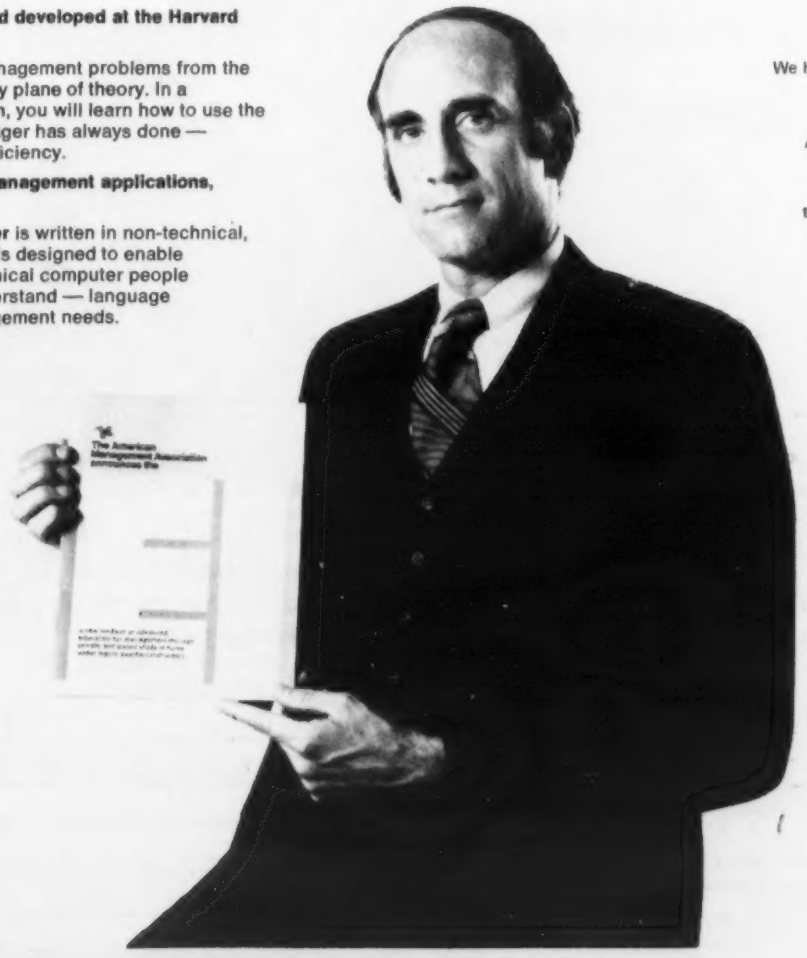

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Small Size Seen As Asset...

Digital Equipment Reports Record Revenues, Earnings

MAYNARD, Mass. – Thinking small can produce large profits even in times of minor recession.

Or at least that seems to be the case with Digital Equipment Corp., the mini-maker here, that had record sales for the last fiscal year, despite belt-tightening and lower earnings reported by some of the "maxi" makers in the computer industry.

DEC President Kenneth H. Olsen said that the record $135 million in sales for the year ended June 27 represents a 48% increase over the revenues reached the previous year.

Earnings for the company scored a more impressive jump of 53% to $14.4 million ($1.51 per share) from the $9.4 million ($1.04 per share) charted the year before.

"We are particularly proud of our people," Olsen said, "who were able to accomplish these gains in a time when the education, research and capital equipment markets were in a recession. In addition, we have been able to maintain our personnel training, plant expansion, new product development, and new market development programs.

"We have followed our accounting practice of charging all of the costs of our development programs against current operations," Olsen said. "During fiscal 1970, the company also felt it was prudent to provide a $4 million allowance against risks in accounts receivable."

Olsen said two significant new computers were introduced last year, the PDP-11, Digital's new 16-bit computer, and the PDP-8/E, which sells for under $5,000.

Other new products DEC has introduced include a line of Pulse Height Analysis systems; the Clinilab-12 system, which processes data from clinical laboratory instruments; and the RAD-8, a PDP-8/I-based system to help plan radiotherapy treatment for cancer patients; a smaller version of the company's solid state controller, the PDP-14/L; Basic-8, a hardware and software package for schools; Dibol, a programming language designed specifically for use by smaller business; and AP-2, a small computer accounting program.

Shipments Set

"During the fourth quarter of fiscal 1970, the company shipped 16 PDP-10 computer systems, the largest number of PDP-10s delivered in any quarter," Olsen said. "The PDP-10 is the company's large-scale computer, and it continues to be popular despite a very definite slowdown in the time-sharing utility industry," he claimed. "During fiscal 1970, some 125 medium-scale PDP-15 computers were delivered," Olsen added.

He noted that the company began building new plants in Westminster, and Westfield, Mass., during the past year, and has expanded its plant facilities in Puerto Rico, Canada, and England. He said the Westfield plant is complete and in operation and the Westminster plant will be completed by early fall.

Recognition Equipment Bucks Trend, Announces Pacts

DALLAS – Recognition Equipment Inc. (REI), which seems to be countering the lowered earnings trend in the optical character recognition industry, has announced $10 million worth of contracts.

The contracts, all signed within the past two weeks, are with domestic, European, and Japanese firms, with the latter representing the firm's first penetration of the Asian market.

Even though the contracts represent a great deal of business, Recognition spokesman indicated that the firm did not plan to re-instate the 100 recently layed-off production workers at its headquarters plant.

The largest contract is for 2 Electronic Retina readers valued at $3.1 million from Mobil Oil, which will install the units in Kansas City to read charge documents.

Another contract, valued at $1.5 million is from Sun Oil which plans the same application at its Tulsa, Okla., data processing center. The two oil firms join ten others that have OCR equipment from Recognition.

The state of Ohio is another new customer, which ordered a system valued at $900,000 to be used for driver licenses and other motor vehicle department applications in Columbus. It joins five other state governments as a REI customer.

The firm's first Asian contract is with Janome Sewing Machine Co. of Tokyo and is valued at $700,000. The firm will operate the system on a service bureau basis for outside customers and will also use it to read payment slips from customers.

The three contracts in Europe include two from German social security agencies. The contract with the Berlin Social Security Institute is valued at $1.3 million, while the contract with the Frankfurt Social Security Institute for Factory Employees carries a $1.7 million price tag.

The final contract, valued at $800,000 is with the Cooperative Centrale Boerenleenbank, AN Indhoven in the Netherlands, which has over 1,000 branch offices.

REI President Herman L. Phillipson Jr. said that the firm's backlog of orders and letters of intent now stands at $33.8 million, up from a backlog of $27.7 million reported on June 12.

Former Levin-Townsend President Talks With Computer Resources on His Future

NEW YORK – The former head of Levin-Townsend Computer Corp. says it's "too early" for him to discuss the possibility of acquiring a significant equity interest in Computer Resources Inc., a company which leases and assembles disk packs, "basically for IBM equipment."

Howard S. Levin, ousted last January from his presidential post in a dispute over the financial effects of a diversification program, confirmed an earlier announcement by Computer Resources Inc.'s Chairman, Robert Disbrow, that "preliminary negotiations" had started. It was mentioned that Levin might also "assume significant management responsibilities."

Levin stated Computer Resources is worth about $2.2 million. In fiscal 1969, ended Sept. 30, the firm earned $238,772 on sales of about $1 million. The company, he added, has 400,589 outstanding shares.

Levin, still a director of Levin-Townsend, holds a big block of that company's stock outstanding, and is considered to be the largest single shareholder.

Control Data Plans Deals With Two French Firms

MINNEAPOLIS – Control Data Corp. and two French companies, Thomason-CSF and Compagnie Internationale pour L'Informatique (CII), have signed agreements providing for the exchange of specific research and technology between the three companies.

The exchange agreements involve advanced computer related research from Thomson-CSF and CII, and peripheral equipment technology in the areas of disk storage drives and optical character recognition equipment from Control Data.

Tomson-CSF is a large and diversified electronics manufacturing company, and its partially-owned subsidiary CII is a leading French computer maker.

Sanders Shares Sold to Solitron Inc. Raising Rumors of Possible Merger

NEW YORK – What now seems to be a tempest in a teapot erupted here last week with the announcement that Solitorn Devices Inc. was purchasing stock of Sanders Associates Inc. of Nashua, N.H.

Sanders has been one of the favorite subjects in the merger rumor mill lately and the announcement of the purchases started the "reports" of a possible merger or take-over on the rounds once again.

However, late in the week, Solitron President Benjamin Friedman declared that the purchase had been for investment only and that there was no intention of a take over. However, Solitron would not disclose the size of the stock purchases, except to describe them as "small."

Friedman said his firm invested in various high- technology firms and that the investment in Sanders could be taken as an expression of faith in its future.

The merger plans would have seemed a little lopsided, based on the size of the two firms.

In the latest full year figures, Sanders revenues outpaced Solitron's by over 500%. In its 1969 fiscal year Sanders reported $187 million in sales to Solitron's $30 million for the year ended Feb. 28, 1970.

However in the income statement, Solitron's $7 million in earnings outpaced the Sanders loss of $2 by a considerable amount.

ISI to Acquire National Unit In Planned Deal

BABSON PARK, Mass. – Information Services Inc. has purchased Becker Research Corp., a subsidiary of National Information Services Inc., Cambridge, Mass. Purchase terms were not disclosed.

Information Services is in the field of computerized marketing, information and communications, while Becker Research Corp. is a New England survey research firm, specializing in industrial and consumer marketing and public opinion research.

Becker said that the new affiliation would not affect the status of any on-going projects and client relationships. "In fact it will serve to strengthen our capabilities," the firm said.

Faim Information Report Shows Income, Sales Up

NEW YORK – Faim Information Services, Inc. is maintaining its growth pattern, reporting sharply increased sales and an after-tax net which is double the same period a year earlier, despite what it calls a "recessive business climate."

Robert S. Snoyer, chairman, said unaudited figures for the first six months of the fiscal year ended May 31 showed revenues of $580,038 compared to $284,048 for the same period a year earlier. Net income increased from $26,506 to $56,625.

After-tax profit for the first half was better than 6 cents per share, up 100% from the 3 cents reported for the same period a year earlier.

"In the last few weeks we have begun to see evidence that the computer technology segment of the economy has begun to improve," Snoyer said. "Projects which were delayed by blanket corporate cutbacks are beginning to move forward in various areas

CMC Six Month Earnings, Sales Announced in LA

LOS ANGELES – Sales of $4,905,864 were reported by Computer Machinery Corp. for the six months ended June 30, 1970. Income before taxes was $810,019. Net income was $353,749 or 9 cents per share based on 4 million shares outstanding.

Results for the first six months of 1970 consolidate domestic and international operations. Although international operations indicated a loss of $399,569 during the period, CMC president James K. Sweeney said that KeyProcessing System installations are presently being made in England and installations will begin in France this September.

In addition, he said that the English subsidiary, Computer Machinery Co. Ltd., is now manufacturing equipment for customer delivery. Overseas start-up costs have been charged in full against domestic net income, but anticipated foreign income should reduce international losses in the coming months at a rapid rate, he said

CMC presently has over 450 employees; 350 in the United States, with more than 100 in England and France.

In the past year, CMC has installed over $10 million worth of KeyProcessing Systems; over $2 million in July-December.

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Telex Earnings Increase 200% in First Quarter

TULSA, Okla. – Telex Corp. has reported an increase in earnings in excess of 200% during the quarter ended June 30 in comparison with the same period last year.

Results for the firm's first quarter show earnings of $2,337,000 or 23 cents per share on revenues of $16,750,000. During the same quarter in 1969, income reached $771,000, 8 cents per share on revenues of $9,459,000.

In a note to stockholders, Roger M. Wheeler, chairman and chief executive officer, said the "favorable first quarter results continue to mirror the fine performance of the computer products group.

"Compared with the first quarter last year, the gross sales of the group more than doubled. The increase in profits was even more striking."

The jump in sales by the group "reflects the impact of early deliveries of our Model 5312 disk pack drive and its companion controller," Wheeler added.

In addition, he indicated that product plans are "proceeding on schedule." The Model 5400 series of tape drives is in the pilot run phase with deliveries scheduled for the second quarter, Wheeler stated.

The chief executive officer also noted that a new line of printer-controllers is "well along in the engineering and prototype phase, and deliveries are expected early in the next fiscal year."

The firm's communications group is not yet a significant factor in the firm's overall profits, Wheeler said, but he noted that the new unit's earning "increased significantly over the comparable quarterly period a year earlier."

PSC Reports Rise In First Half Sales, Earnings

NEW YORK – Programming Sciences Corp. has reported sales for the first six months of fiscal 1970 rose to $1,604,210. Net income for the period, including a federal income tax loss credit, was $86,848 or 5 cents per share.

For the six months period in fiscal 1969, the company reported sales of $1,170,569 and net income of $41,340, 2 cents per share, including a tax credit.

The per share earnings were restated to reflect a 2-for-1 stock split approved by stockholders on May 15, 1970. The 1969 figures were restated to reflect current accounting practices.

First Profitable Period In Two Years Set at Beta

NEWTON, Mass. – Beta Instrument Corp. has announced its first profitable quarter in more than two years.

According to Norman M. Fine, president, earnings for the second quarter 1970 were $34,250 or 2 cents per share after reflecting extraordinary income of $15,000, a 1 cent per share tax credit, on sales of $612,635 as compared with losses of $130,708 (16 cents per share) on sales of $169,335 for the same period a year ago.

Fine said for the six months ended June 30, sales reached $1,039,254, the highest level ever attained in the company's history. Sales for the entire year of 1969 were $901,715.

Operational losses for the first half of 1970 were reduced to $17,161 or 2 cents per share as compared with losses of $192,570 or 24 cents per share for the first six months of 1969.

Fine noted that beginning with the first quarter 1970 product development expenses have been capitalized, whereas in 1969 all such costs were expensed.

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TRADE*QUOTES

Computerworld Stock Trading Summary

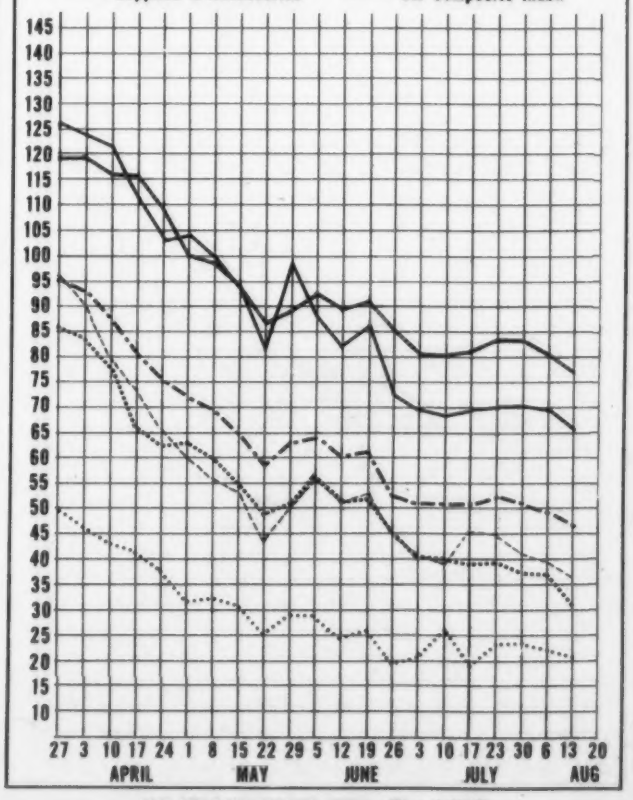
All statistics compiled, computed and formatted by TRADE*QUOTES Division of National Information Services, Inc. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, AUGUST 13, 1970

EXCH		1970 RANGE (1)	CLOSE AUG 13 1970	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	1 1/4	0	0.0
A	APPLIED DATA RES.	4- 24	4	- 5/8	-8.5
O	APPLIED LOGIC	3- 19	2 5/8	- 1/4	-8.6
O	ARIES	1- 8	1 3/8	0	0.0
A	AUTOMATIC DATA PROC	23- 47	26	-3 7/8	-12.9
O	AUTO SCIENCES	4- 14	4	-2 3/4	-40.7
O	BRANDON APPLIED SYS	1- 9	1 1/2	0	0.0
O	COMPUTER AGE INDUS.	1- 3	1	0	0.0
A	COMPUTER APPL	2- 12	2	- 1/8	-5.8
O	COMPUTER ENVIRON	3- 14	2 3/4	- 3/4	-21.4
N	COMPUTER INDUS.	2- 10	3	0	0.0
O	COMPUTER NETWORK	3- 14	6	- 1/2	-7.6
O	COMPUTER PROPERTY	6- 15	5 1/2	- 3/8	-6.3
N	COMPUTER SCIENCES	6- 34	6 5/8	+ 1/2	+8.1
O	COMPUTER USAGE	2- 8	2 1/4	0	0.0
A	COMPUTING & SOFTWARE	16- 75	19 3/8	-2 5/8	-11.9
O	COMRESS	2- 10	2 1/4	- 3/8	-14.2
O	COMSHARE	3- 15	3 1/4	0	0.0
O	CONSOL. ANAL. CENT.	1- 3	+ 7/8	0	0.0
O	DATA AUTOMATION	1- 24	1 1/4	- 3/4	-37.5
O	DATA PACKAGING	5- 29	6	- 1/4	-4.0
O	DATAMATION SERVICE	1- 6	1	- 3/8	-27.2
O	DATATAB	5- 9	5 1/8	- 3/8	-6.8
O	DIGITEK	2- 5	2 1/4	- 1/8	-5.2
O	EDP RESOURCES	5- 15	5 1/2	0	0.0
A	ELECT COMP PROG	3- 11	2 7/8	- 1/4	-8.0
O	ELECTRONIC DATA SYS.	31-161	46 1/2	-8	-14.6
O	INFORMATICS	4- 24	5 1/2	+ 1/8	+2.3
A	ITEL	6- 26	7 7/8	- 7/8	-10.0
O	LEVIN-TOWNSEND SERV.	1- 13	2 1/2	- 1/4	-9.0
A	MANAGEMENT DATA	8- 25	8	-1 1/4	-13.5
O	NAT COMP ANALYSTS	2- 8	3	- 1/2	-14.2
O	NAT.COMP. SERV.	3- 12	5 1/4	- 3/4	-12.5
N	PLANNING RESEARCH	13- 54	15	- 3/4	-4.7
O	PROGRAMMING METHODS	9- 27	9 1/2	- 1/2	-5.0
O	PROGRAMMING & SYS	2- 5	2	0	0.0
O	PROGRAMMING SCIENCES	2- 33	2	- 5/8	-23.8
N	SCIENTIFIC RESOURCES	2- 22	2	- 3/4	-27.2
O	SOFTWARE SYSTEMS	1- 2	+ 5/8	0	0.0
O	TBS COMPUTER CENTERS	6- 27	7	-1	-12.5
O	UNITED DATA CENTER	2- 4	2 1/2	+ 1/4	+11.1
N	UNIVERSITY COMPUTING	14- 99	14	-1	-6.6
A	URS SYSTEMS	5- 21	5 1/8	- 5/8	-10.8
O	U.S. TIME SHARING	3- 14	3 1/2	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	21- 62	24 5/8	-1 3/8	-5.2
O	ALPHANUMERIC	2- 15	2 7/8	0	0.0
N	AMPEX CORP	13- 48	13 1/2	-1	-6.8
A	ASTRODATA	4- 34	4	- 1/4	-5.8
O	BOLT,BERANEK & NEW	3- 11	8	- 1/4	-4.0
N	BUNKER-RAMO	6- 14	7 1/8	- 3/8	-5.0
A	CALCOMP	11- 33	10 7/8	0	0.0
O	COGNITRONICS	3- 13	3	- 3/8	-11.1
O	COLORADO INSTRUMENTS	4- 13	6 1/8.	+ 1/8	+2.0
O	COMPUTER COMMUN.	6- 36	5 3/4	- 1/4	-4.1
A	COMPUTER EQUIPMENT	4- 12	4	0	0.0
A	COMPUTEST	13- 28	15 3/8	-1 7/8	-10.8
A	DATA PRODUCTS CORP	5- 26	5 1/8	+ 3/8	+7.8
O	DATA TECHNOLOGY	5- 25	5 1/8	-1	-16.3
O	DIGITRONICS	5- 13	4 3/4	- 1/4	-5.0
N	ELECTRONIC M & M	7- 40	7	+ 3/8	+5.6
O	FABRI-TEK	3- 8	3 1/4	- 1/4	-7.1
O	FARRINGTON MFG	2- 17	2 1/2	- 1/4	-9.0
O	INFORMATION DISPLAYS	5- 20	5 1/4	- 1/2	-8.6
A	MARSHALL INDUSTRIES	14- 67	14 3/8	+ 1/8	+0.8
A	MILGO ELECTRONICS	15- 84	18 7/8	-1	-5.0
N	MOHAWK DATA SCI	19- 87	18 1/2	- 3/8	-1.9
O	OPTICAL SCANNING	12- 52	12	-1 1/2	-11.1
O	PHOTON	4- 17	7 3/8	- 1/4	-3.2
O	PHOTO-MAGNETIC SYS.	1- 4	1 1/4	- 1/2	-28.5
A	POTTER INSTRUMENT	15- 42	16	- 3/8	-2.2
O	PRECISION INST.	7- 25	8 1/4	-1 1/4	-13.1
O	RECOGNITION EQUIP	13- 83	13 1/4	- 3/4	-5.3
O	REDCOR CORP.	4- 34	4 5/8	+ 1/2	+12.1
N	SANDERS ASSOCIATES	7- 29	9	0	0.0
O	SCAN DATA	7- 53	6 1/2	-1 1/4	-16.1
O	TALLY CORP.	10- 23	10 1/2	-1 1/2	-12.5
N	TELEX	10- 25	10 1/4	-1 5/8	-13.6
O	VIATRON	5- 51	5 1/4	- 1/8	-2.3
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 15	9 7/8	- 1/8	-1.2
O	BALTIMORE BUS FORMS	11- 21	10 1/2	0	0.0
A	BARRY WRIGHT	6- 25	7	- 3/4	-9.6
A	DATA DOCUMENTS	15- 35	16 1/4	- 1/2	-2.9
N	ENNIS BUS. FORMS	11- 19	13 1/4	- 1/8	-0.9
O	GRAPHIC CONTROLS	7- 17	6 7/8	- 1/8	-1.7
N	MEMOREX	46-166	47 1/4	- 3/4	-1.5
N	3M COMPANY	71-114	79 7/8	-2 3/8	-2.8
O	MOORE BUS. FORMS	27- 38	29 1/2	+ 1/4	+0.8
N	NASHUA CORP	21- 43	27 7/8	- 1/8	-0.4
O	REYNOLDS & REYNOLD	25- 48	29 1/4	-1 1/4	-4.0
O	STANDARD REGISTER	17- 30	18	-1 3/4	-8.8
N	UARCO	22- 39	22 3/4	- 1/2	-2.1
A	WABASH MAGNETICS	8- 30	7 1/2	-1	-11.7
O	WALLACE BUS FORMS	25- 41	32 3/4	0	0.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	88 1/8	-5 5/8	-6.0
N	COLLINS RADIO	9- 37	10 3/4	- 1/2	-4.4
N	CONTROL DATA CORP	50-122	32 7/8	-1	-2.9
A	DIGITAL EQUIPMENT	50-124	54 1/2	-2 1/8	-3.7
N	ELECTRONIC ASSOC.	3- 11	3 3/4	- 3/8	-9.0
A	ELECTRONIC ENGINEER.	3- 14	4 1/2	- 3/4	-14.2
N	FOXBORO	18- 39	18 3/8	-1 5/8	-8.1
O	GENERAL AUTOMATION	9- 42	9	-2 1/2	-21.7
N	GENERAL ELECTRIC	60- 77	73 1/2	-1 7/8	-2.4
N	HEWLETT-PACKARD CO	19- 45	19 3/8	-3	-13.4
N	HONEYWELL INC	65-152	79 3/8	-3	-3.6
N	IBM	225-387	225	-25 1/2	-10.2
N	NCR	30- 86	30 1/4	-2 1/4	-6.9
N	RCA	18- 34	22 1/4	- 1/2	-2.1
N	RAYTHEON CO	16- 33	17 7/8	+ 1/8	+0.7
O	SCI. CONTROL CORP.	1- 8	2 5/8	+ 7/8	+50.0
N	SPERRY RAND	19- 40	19	-1 7/8	-8.9
A	SYSTEMS ENG. LABS	10- 49	11 5/8	- 1/4	-2.1
N	VARIAN ASSOCIATES	9- 29	11	+ 7/8	+8.6
A	WANG LABS.	18- 51	21 5/8	- 5/8	-2.8
N	XEROX CORP	66-115	66	-5	-7.0
	LEASING COMPANIES				
O	BOOTHE COMPUTER	8- 25	8 1/4	0	0.0
O	BRESNAHAN COMP.	5- 9	3	- 3/8	-11.1
O	COMPUTER EXCHANGE	2- 8	5 3/8	- 3/8	-6.5
O	COMPUTER LEASING	4- 18	5	0	0.0
N	DATA PROC. F & G	6- 32	7 3/4	- 3/4	-8.8
O	DATRONIC RENTAL	2- 8	2 5/8	- 1/4	-8.6
A	DEARBORN COMPUTER	10- 24	12	-1 3/4	-12.7
O	DIEBOLD COMP. LEAS.	2- 6	2 3/4	0	0.0
A	DPA, INC.	3- 10	3 5/8	- 1/8	-3.3
A	GRANITE MGT	7- 22	9 1/4	- 3/8	-3.8
A	GREYHOUND COMPUTER	5- 44	5 1/8	- 1/2	-8.8
N	LEASCO DATA PROC.	7- 30	8 1/8	- 1/8	-1.5
O	LECTRO COMP LEAS	2- 5	2	- 3/8	-15.7
A	LEVIN-TOWNSEND CMP	3- 19	4 1/4	- 1/4	-5.5
O	LMC DATA, INC.	1- 3	1 3/8	0	0.0
O	MANAGEMENT ASSIST	1- 4	1 3/8	- 1/8	-8.3
O	NCC LEASING	3- 8	3 3/8	- 1/2	-12.9
O	SYSTEMS CAPITAL	2- 8	2 3/4	0	0.0
A	U.S. LEASING	3- 19	11	-2	-15.3

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

DIGITAL EQUIPMENT CORP.
Year Ended June 27

	1970	a1969
Shr Ernd	$1.51	$1.04
Revenue	135,000,000	91,000,000
Earnings	14,400,000	9,400,000

a-Restated by company. b-After deduction of a $4 million reserve against risks in accounts receivables.

COMPUTEST CORP.
Year Ended May 31

	1970	1969
Shr Ernd	$.92	$.53
Revenue	11,660,324	7,743,824
Earnings	859,148	493,210

LEVIN-TOWNSEND COMPUTER
Year Ended March 31

	1970	1969
aShr Ernd	.....	$4.25
Revenue	$62,352,094	68,636,479
bNt Cont. Op	5,458,536	11,390,832
Loss Dis Op	2,784,696	30,633
Invest Loss	5,138,265	c1,823,644
Spec Chg	d26,304,595	.....
Earnings (Loss)	(28,769,020)	13,183,843

a-Based on income before special charge and on common and common equivalent shares. b-Equal to $1.65 a share in 1970 and $3.68 a share in 1969. d-Consists of $10,069,855 related to write-offs for the Bonanza Hotel and Casino, $7,557,578 related to write-down on the company's interest in certain Nevada real estate, and $8,677,162 related to the write-off of good-will and other times.

GRAPHIC CONTROLS CORP.
Six Months Ended June 30

	1970	1969
Shr Ernd	a$.29	$.56
Revenue	12,804,583	11,417,154
Spec Cred	b69,381	.....
Earnings	c303,916	461,801

a-Based on income before special credit. b-Consists of gain on sale of property less expenses associated with merger negotiations recently terminated. c-Equal to 37 cents a share.

APPLIED DATA RESEARCH
Three Months Ended June 30

	1970	a1969
Revenue	$1,924,000	$1,547,000
Earnings (Loss)	(48,000)	1,000
6 Mo Shr	.....	.08
Revenue	3,276,000	3,046,000
Earnings (Loss)	354,000	78,000

a-Restated to reflect acquisitions.

DATA PRODUCTS CORP.
Three Months Ended June 27

	1970	1969
Shr Ernd	$.04	$.05
Revenue	9,796,000	8,989,000
Earnings	232,000	318,000

AMERICAN COMPUTER LEASING
Three MOnths Ended June 30

	1970	1969
aShr Ernd	$.26	$.23
Revenue	2,108,798	1,709,721
bSpec Cred	96,779	129,647
cEarnings	641,739	581,513
6 Mo Shr	.36	.35
Revenue	4,044,955	3,371,086
bSpec Cred	243,649	203,071
Earnings	990,444	908,603

a-Based on income before special credit. b-Tax savings. c-Equal to 31 cents a share for the quarter and 48 cents a share for the six-month period of 1970 compared with 29 cents a share with 45 cents a share respectively, in like periods of 1969.

ITEL CORP.
Three Months Ended June 30

	1970	1969
Shr Ernd	$.20	$.22
Revenue	17,061,000	10,047,000
Earnings	852,000	844,000
6 Mo Shr	.39	.39
Revenue	29,508,000	17,415,000
Earnings	1,600,000	1,493,000

DATA DOCUMENTS INC.
Nine Months Ended June 30

	1970	1969
Shr Ernd	$1.41	$1.36
Revenue	18,262,878	15,186,249
Earnings	663,308	631,758

BANISTER CONTINENTAL
Three Months Ended June 30

	1970	1969
Shr Ernd	.....	$.15
Revenue	$2,675,000	7,336,000
Earnings (Loss)	(140,000)	313,000

WABASH MAGNETICS INC.
Three Months Ended June 30

	1970	1969
aShr Ernd	$.05	$.16
Revenue	6,296,597	6,445,780
Earnings	90,860	287,453
a6 Mo Shr	.21	.30
Revenue	13,608,536	12,478,765
Earnings	369,988	530,155

a-Assumes conversion of series A preferred stock.

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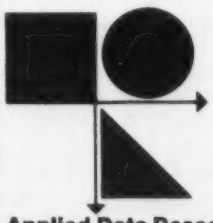

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